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1792

Reports

REPORTS
OF THE TRUSTEES
OF THE
PHILADELPHIA GAS WORKS
TO THE
SELECT AND COMMON COUNCILS
OF THE
CITY OF PHILADELPHIA.

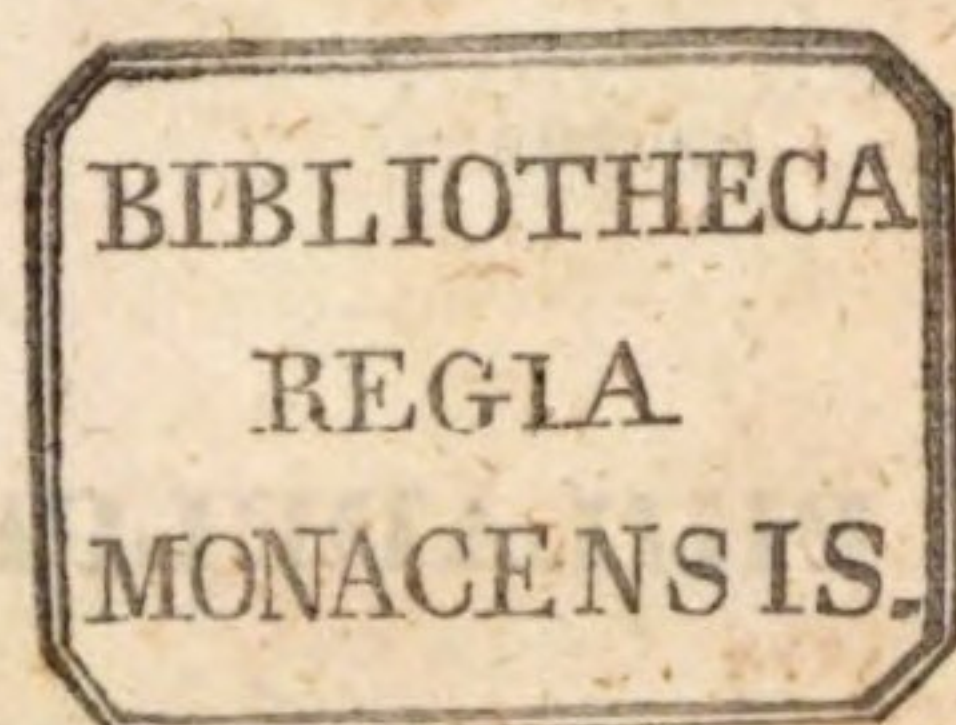
TO WHICH ARE ADDED,

1. THE REPORTS OF COMMITTEES OF COUNCILS PRIOR TO THE ESTABLISHMENT OF THE PHILADELPHIA GAS WORKS.
2. THE REPORT OF S. V. MERRICK, ESQ. ON THE GAS WORKS OF EUROPE.
3. THE ORDINANCES OF THE SELECT AND COMMON COUNCILS, IN RELATION TO THE WORKS, THE BY-LAWS OF THE BOARD, &c. &c.

PHILADELPHIA.

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1838.



TRUSTEES

OF THE PHILADELPHIA GAS WORKS,

Elected,

1835,—March 28th,	{	MATTHIAS W. BALDWIN, THOMAS CAVE, JOHN FARR, FREDERICK FRALEY, ROBERT M. HUSTON, M. D. WM. H. KEATING, JOHN R. LATIMER, JOHN P. WETHERILL.
1836—January 28th,		JOHN SITER,
1837—January 19th,		FREDERICK BROWN,
———Nov. 23d,		ALEXANDER FERGUSON,
1838—April 12th,		JOHN WIEGAND.

STANDING COMMITTEES.

On Works.

FRED. FRALEY,—*Chairman.*

M. W. BALDWIN,	THOMAS CAVE.
JOHN FARR,	FRED. BROWN.
JOHN R. LATIMER.	

On Distribution.

JOHN P. WETHERILL,—*Chairman.*

WM. H. KEATING,	JOHN SITER,
JOHN R. LATIMER,	JOHN WIEGAND.

On Finance.

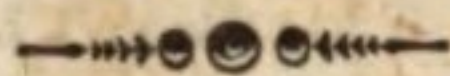
WM. H. KEATING,—*Chairman.*

JOHN SITER,	JOHN R. LATIMER,
M. W. BALDWIN,	JOHN WIEGAND.

NAMES OF THE PERSONS WHO HAVE CEASED TO BE TRUSTEES.

<i>Benjamin W. Richards, elected March 28th, 1835, resigned 20th June, 1835.</i>					
<i>Alexander D. Bache,</i>	<i>do.</i>	<i>do.</i>	<i>do.</i>	<i>do.</i>	<i>19th January, 1837.</i>
<i>Henry M. Zollickoffer,</i>	<i>do.</i>	<i>do.</i>	<i>do.</i>	<i>do.</i>	<i>March 1838.</i>
<i>Ephraim Haines,</i>	<i>do.</i>	<i>do.</i>	<i>do.</i>	<i>deceased, Nov. 1837.</i>	
<i>John K. Mitchell, M. D.</i>	<i>do.</i>	<i>July 9th,</i>	<i>do.</i>	<i>resigned 28th January, 1836.</i>	

OFFICERS OF THE BOARD.



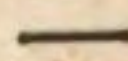
President,
R. M. HUSTON.



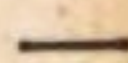
Register,
WM. FENNELL.



Consulting Engineer,
SAMUEL V. MERRICK



Superintendent,
JOHN C. CRESSON.



Inspector,
THOMAS NICHOLSON.



Messenger,
JOHN P. MURTA.



Inspector of Meters,
JOHN BURROWS.

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ERRATA.

Page xxxvi.	The addition at the foot of the 5th column should read 34 instead of 38.
Page xxxvii.	Cash account, credit column, 8th line, for \$5,553 92, read \$5,550 99.
Page xxxvii.	Sinking Fund, credit column, 1st line, for \$302, read 308.
" "	" " 3d line, for 44, read 67.
Page 122.	Line 1st, for 1836. read 1835.

PREFACE.

THE TRUSTEES OF THE PHILADELPHIA GAS WORKS comply with a request made to them by many of the stockholders, and other persons interested in the success of the works, by collecting and publishing in a permanent form, the several reports, ordinances, and other documents relating to the establishment; some of which were never published, and others are so scattered, as to make the collection of them difficult, and to many persons, impossible.

These present almost a complete history of the Works, from the first proposal of the scheme, in Councils, in 1832, down to the present period; and for more easy reference, have been divided into three parts :—

In the *First* are placed the three Annual Reports, by the Trustees to the Councils, made in the months of January, 1836, 1837, and 1838; and to these are attached the Minutes of the Stockholders at their several meetings. This may be considered as the official history of the Works from their first institution to the present time.

In the *Second* part, the Reports which were made by committees of the city Councils to those bodies, have been collected; and the interesting and instructive Report, by Mr. Merrick, of the examination made by him of the principal gas works of Europe, during a mission undertaken by order of Councils, will be found included under this head. The Trustees have taken great pains to collect as many of the Reports to Councils as they could; and they think few of any importance have been omitted. The difficulty of collection can be estimated only by those who have ever endeavoured to gather up ephemeral publications, a few years after they had first appeared. The Trustees have published all they succeeded in obtaining; except one or two, so unimportant, as not to justify the swelling of the publication by reprinting them. They regret that valuable documents, for which they made diligent search, could not be found.

PREFACE.

If the circulation of this volume should have the effect of bringing to light any of the omitted Reports, it will be a satisfaction to the Trustees to embody them in some future publication. One of the Reports, (that by the Committee of Finance, made on the 7th of February last,) was obtained too late to be published in its appropriate place, and has been inserted at the end of the volume. This part may be considered as containing the preparation for the establishment of GAS WORKS in our city, and will sufficiently manifest the extreme caution with which our Councils acted in the matter.

The *Third* part includes the several Ordinances and Resolutions, passed by Councils, and constitutes the legislation in relation to the Works. All the ordinances of a general character have been embodied. No ordinance or other action of Council has been intentionally omitted, except such as related exclusively to the lighting of their halls, markethouses, or other public property with gas. The republication of those ordinances could not have added to the interest of the volume, and would have swelled its size unnecessarily.

The Trustees are well aware of the imperfections of this collection;—for these, they trust an apology will be found in the numerous engagements, public and private, of every member of the Board, which prevented any one of them from devoting to it his undivided attention. Many of the documents were discovered only accidentally—some were not found at the time when they were wanted; and when obtained, it was too late to place them in their appropriate order.

In the search for materials, the Trustees felt a natural anxiety to ascertain the name of the individual with whom originated the idea of lighting this city with gas. A gentleman who was at one time an active and highly valuable member of Councils, (the late John B. Wallace, Esquire,) had, a few years since, informed one of the Trustees, that the scheme was first suggested while he was in Councils, by the late Dr. Bollmann—whose taste for, and great acquirements in science, are well known. This was rendered the more probable, as Dr. Cooper, in the preface to his Essay on Gas-lights, (which appeared in 1816) alludes to that gentleman as having furnished him information in relation to the manufactories of gas in Europe.

PREFACE.

A diligent search was made of the Minutes of Councils, in relation to this subject, from the year 1795, down to the present time ; and the first notice of gas was found to be in the following words :—

“ 1815, Dec. 28.—In Common Council.

“ A letter from James M'Murtrie, on the subject of introducing gas lights in the city was received, read, and laid on the table.”

That letter has been searched for among the records of Councils, but could not be found ; and application was made to our respected fellow citizen, Mr. James M'Murtrie, for a copy of it. This, unfortunately, he had not preserved ; but we were informed by him, and we have authority from him to state, that at the time when he addressed that letter to Councils, he was on terms of great intimacy with Dr. Bollmann ; they had shortly before returned together from Europe, where they had carefully examined the recently established gas works of England. We understand from Mr. M'Murtrie, that the application was made by him as more likely to be successful, he being a native citizen. They were to be united in the management of the establishment ; and we believe that the intention then was to manufacture the gas from wood. It was Dr. Bollmann's desire to connect this manufactory with that of pyroligneous acid, which was to be used in the preparation of white lead, upon the plan of the works at Clichy, in France ; of the success of which, it is well known that he felt very sanguine.

The following extracts from the Minutes of Councils, are interesting, as showing the importance which was attached at an early period to this matter.

“ 1815, Dec. 28.—On motion of Mr. Lehman, the following resolution was adopted, and sent to the Select Council for concurrence, viz :—

“ *Whereas* gas-lights have by actual experience in the city of London, been found to cost less and to yield a better light than oil-lamps, and there is good reason for believing that they may be introduced with advantage into the city of Philadelphia, as the materials for making the apparatus, and for preparing the gas, are abundant in the United States.

“ *Be it resolved*, That a committee of two members from each Council, be appointed to ascertain the facts as far as they are able, relative to the effect and economy of gas-lights, and to procure for

PREFACE.

the use of Councils, copies of such books relative to the subject of gas-lights, as they may deem useful, and to consider the practicalness and expediency of facilitating and encouraging the use of them within the city of Philadelphia.

“Common Council appointed Messrs. Lehman and Thompson. Select Council concurred and appointed Messrs. Rush and Vaux.

“On motion, the letter of Mr. M'Murtrie on the subject of gas-lights, was referred to the last named committee. Select Council concurred.”

Soon afterwards a letter was received on the subject from Mr. Wm. S. Allison, and on the 14th of November, 1816, Councils adjourned at an early hour “for the purpose of witnessing the illumination of the New Theatre by means of gas” on an invitation from Messrs. Pratt and Kugler.

In 1817, the Councils appointed a standing committee of three members of each Council, “to ascertain, and communicate from time to time to Councils whatever facts relate to the improvements which may be made in that art, and to recommend, when they think proper, a plan for its introduction into general use.”

This committee was discontinued after a year or two.

Whether the manufacture of gas could have been successfully established about that time or not, is a question of some interest, but upon which we have not sufficient data to decide. Experiments made then, or soon after, in Baltimore, New York, and other cities, were very far from successful. The filth, the stench, the nuisances of various kinds, and the pecuniary losses attending those establishments, not only prevented our city from following the example, but they created on the part of a large, intelligent, and respectable portion of our community, exercising, necessarily, great influence over our Councils, so deep-rooted a prejudice against gaslights, as to prevent, for many years, the success of all applications to Councils to countenance them; and when finally the reaction in the public mind, chiefly in the younger portions of the community, forced the subject upon their attention, it produced one of the most exciting questions ever brought before them. It might seem invidious now to allude to any of the individuals who opposed the establishment of what is at present conceded by all to be a source of additional comfort and luxury to the mass of our citizens.

Those, however, who most violently opposed it, and who have

PREFACE.

had the candour since to acknowledge their error, will recollect that many of them were the active agents in introducing into our city the greatest of all comforts, an exhaustless supply of wholesome water; and that while they were great benefactors to the community, they had to overcome the opposition of many a *laudator temporis acti*.

It must be admitted also, that the well meant but injudicious apparatus established at the Masonic Hall, many years since for supplying that building with gas, (although altered, modified, and occasionally improved,) was by no means calculated to remove the objections of the opponents. In urging the introduction of gas-lights generally, the friends of the measure were obliged to resort for evidences of success to the experience of Europe, discarding in a great measure that obtained either at home or in several of our neighbouring cities.

An application was made in 1826-7, by Messrs. Robinson and Long, for permission to lay pipes in the streets.—This was declined. The history of it will be found at page 37, of this volume.

It appears to have been in the fall of 1830, that the discussion of the subject was again revived. A petition was presented by a number of gentlemen to Councils, asking them to sanction an intended application to the Legislature for a charter to incorporate a company to manufacture gas for lighting the city and liberties of Philadelphia. The application was refused, but a committee of inquiry was appointed. Mr. Lippincott, who was a member of that committee, appears to have been from that time until his retirement from Councils in the fall of 1835, an active, intelligent, and zealous friend to the measure.

The first step, however, connected with the present works, may be considered to have been taken after the election in the fall of 1832, when the unfinished item in relation to the lighting of the city with gas, was referred to a committee, consisting of Messrs. Lippincott, Wetherill, and Eyre, of Select Councils; and Messrs. Merrick, Huston, and Gilder, of Common Councils. The history of that measure will be traced among the several reports contained in the second part of this volume.

During the progress of these inquiries, several applications had been made by individuals or companies, for the privilege of establishing gas works at private expense, offering to Councils terms more or less advantageous to the public; but these were all de-

PREFACE.

clined ;* fortunately, as it has turned out, since it has resulted in the establishment of works which are believed to combine peculiar advantages. The present works being the private property of individuals associated for this purpose, there is a disposition to avoid those extravagant expenditures or unjustifiable extensions which are frequently the cause of failure and bankruptcy in works carried on at public expense ; while the general control of the works, and the selection of the agents remaining entirely in the hands of the city authorities, the public good is not made subservient to private interests ; and the Trustees may perhaps be permitted to state here, that in the deliberations of the Board to which they had the honour of being appointed by Councils, they have felt themselves invested with a high, honourable, and responsible *trust* ; they have considered themselves really as acting the part of *trustees*, whose duty it was to advance the interests of their stockholders, to the fullest extent compatible with the rights and interests of the public at large.

Those duties might, perhaps, have been too responsible and too difficult for them successfully to discharge them, had it not been for the generous and candid support which they have received from the community at large, for the kind confidence manifested by the stockholders, and for the great assistance which they derived in the outset, from the talents and high character of their engineer, whom public opinion unanimously designated as the only individual upon whom the appointment should be conferred.

With his advice and co-operation all the subsequent appointments were made, and the Trustees have been relieved from all care except that of exercising a general superintendence over the whole establishment.

It was the intention of the Trustees to include in this volume a minute description of the works, accompanied by plates.—This, in

* The Trustees have not succeeded in ascertaining the names of all who applied ; they know, however, that Richard Peters, Esq., William Meredith, Esq., our late highly respected recorder, Joseph M'Ilvaine, Esq., of this city, and Messrs. Robinson and Long, of Baltimore, Mr. T. Dewey, of New York, and several other gentlemen, whose names are now not known, were concerned in the several applications made. Some pamphlets were published : one they know of, by Mr. Peters ; but the Committee have not been able to procure copies of them. Applications were made in several quarters where it was supposed they might prove successful, but all in vain.

PREFACE.

order to be useful, should of course be carefully prepared by a competent person. The Trustees have expressed to their superintendent, John C. Cresson, Esq., their desire that he may soon be able to find leisure to write such a statement; and in the hope that he may be induced to undertake it, they have abstained from the imperfect one which they might have embodied at this time. No one can do the subject more justice than Mr. Cresson, and it is hoped, that as soon as the extensions which are now making at the works and in the laying of pipes, shall be completed, his leisure will be such as to enable him to comply with what the Trustees believe to be a general desire on the subject.

June 30, 1838.

REPORTS

OF THE

Trustees of the Philadelphia Gas Works

TO THE

SELECT AND COMMON COUNCILS.

FIRST
ANNUAL REPORT

OF THE
TRUSTEES OF THE PHILADELPHIA GAS WORKS.

JANUARY 28, 1836.

To the Select and Common Councils of the City of Philadelphia.

I AM directed by the Trustees of the Philadelphia Gas Works to present to Councils the enclosed report of their proceedings during the past year; and also the proceedings of the stockholders at a meeting held on the 26th instant, together with a written application addressed to the trustees, signed by a large majority of the stockholders, requesting the Trustees, with the consent of Councils, to create two hundred additional shares of stock (in quarter shares,) according to the provisions of the first section of the "Ordinance for the Construction and Management of the Philadelphia Gas Works."

I am likewise instructed to ask of Councils the enactment of an ordinance to enable the trustees to accomplish the wishes of the stockholders, in the manner expressed in the resolution contained in the proceedings of their meeting, and in the application which is herewith communicated.

With great respect, &c.

R. M. HUSTON,
President of the Trustees of the Philadelphia
Gas Works.

Philad. Jan. 28, 1836.

TO THE SELECT AND COMMON COUNCILS OF THE CITY OF
PHILADELPHIA.

In obedience to the fourth section of the "Ordinance for the Construction and Management of the Philadelphia Gas Works," the trustees present the following statement of their proceedings and of their receipts and disbursements, since the time of their election.

The City Treasurer, in conformity to the ordinance, opened a book for subscriptions to the capital stock on the first Monday in April last, and the whole amount was promptly subscribed for.

This enabled the trustees to proceed at once in making plans and contracts for the furtherance of the undertaking. Accordingly, after obtaining the services of an accomplished engineer, they lost no time in engaging workmen, making contracts, and collecting materials of every description for the erection of the buildings; so that scarcely a month had elapsed from the enactment of the ordinance, until the buildings were commenced, orders issued, and contracts made for nearly every thing pertaining to the works.

The buildings are erected on the ground appropriated in the ordinance for the location and use of the gas works, fronting on the river Schuylkill, north of High street.

The plan, as projected by the engineer and adopted by the trustees, is not only tasteful and convenient, but calculated for extension of the different parts, from time to time, as the wants of the city may require, without affecting the symmetry of the whole. It contemplates a series of works, calculated to occupy all the ground appropriated, excepting, perhaps, a part of the water front, and capable of manufacturing gas sufficient for twenty-four thousand argand burners. When fully extended, the works will consist of six sections, each one being complete in itself for the manufacture and storage of gas.

The part of the general plan which has been attempted the present season, consists of a section of one retort house with its lime and purifying house, two gasometers with tanks of masonry, an office on the west side of Ashton street, and a range of shops between the office and Filbert street, behind the enclosing walls of the Ashton street front. Of these, the retort house, lime, and purifying house, office and shops are finished, and require only a few incidental arrangements to be in complete working order.

Enough retorts are set to supply any probable demand for gas for some time to come, and others are in readiness to be put up whenever they may be required. The only matters of importance that remain to retard the operation of the works, are the fixtures of consumers and the gasometers. The former are made by persons employed by the consumers themselves, and are no otherwise controlled by the trustees or their agents than to insure their fitness before gas is let into them. The gasometers are large iron vessels, each having a capacity of thirty-four thousand cubic feet of gas, and require to be perfectly air-tight. They were contracted for very soon after the passage of the ordinance, and were to have been finished, one in September, and the other in October last; but notwithstanding all the efforts of the engineer, aided by the trustees, the contract has not been fulfilled in any particular. At last, however, the contractors have so far finished one of these gasholders, that there is reason to expect that in a very few days more it will be ready for use. An arrangement has been made by which the other will be completed by a different contractor; and it is hoped that it will be accomplished without much delay. In the mean time, if the first one on trial should be found fit for use, as it now seems likely to be, there will be but little difficulty in operating with it until the other is finished.

In their contract for cast-iron pipes for the distribution of the gas through the city, it was the good fortune of the trustees, not only to obtain them of good quality and at fair prices, but with a promptitude and regularity that greatly facilitated their operations. So that notwithstanding the advanced state of the season when the work was commenced, the interruption from frequent heavy rains, and an extension of the pipes not contemplated for the present year, the agent entrusted with this department succeeded in laying the whole in good season.

The entire range of pipes now laid, exclusive of service pipes for consumers, and about 1,500 feet of branches, extends 38,652 feet, or about 7 1-3 miles. Nearly all the cast iron posts for the public lamps required by the city authorities are set; the service pipes attached to the mains ready for the burners, and the lanterns are provided or under contract.

Many of the service pipes for the supply of consumers have likewise been laid, and a competent supply of gasometers are on hand; so that but little remains to be done in order to put the whole in complete operation.

When the shortness of the time is considered, during which so much has been accomplished, under all the disadvantages incident to an undertaking new to the trustees, and to most of the workmen employed, and the handsome and substantial manner in which the greater part of it is done, the Board think they may well congratulate Councils and the stockholders on the present advanced state of the works. Great praise is due to the engineer for the intelligence and untiring industry with which he has pushed every part towards completion; and the credit of much faithfulness is likewise due to all the contractors with the single exception already mentioned.

The receipts during the past year have been only of the capital stock. This was called in in four successive instalments, at short intervals, as it was deemed desirable to secure at once such a disposable capital as to be able to meet with promptitude all the engagements of the trustees, and to secure by cash payments the greatest economy and regularity in the execution of the contracts. The stock was called in in instalments, as follows:—

First instalment, on subscribing, on the 6th of	
April, 1835	10 per cent.
Second instalment, June 1st, 1835	30 “
Third instalment, July 15th, 1835	30 “
Fourth instalment, September 1st, 1835	30 “
	—
	100 per cent.

Notwithstanding the pressure in the money-market which has been felt for many months past, the stockholders exhibited an unusual degree of readiness in responding to the call of the trustees; indeed, of the entire amount, there remains at this time but \$2,290 unpaid.

The disbursements have been as follows:

Expenditures for the works on the Schuylkill	\$44,137 28
“ Distribution (pipes laid in the streets)	42,661 41
“ Service pipes (branches from the main pipes)	3,567 85
“ Public lamps for the streets, supplied by the trustees	1,504 01
“ Stock of bituminous coal laid in	1,488 50
	—
	\$93,359 05

In addition to the above, the engineer estimates that there will be required to complete the works, and place them in a condition to become productive :

For gasometers, &c. &c., at the works on Schuyl-	
kill - - - - -	\$10,000 00
For service pipes to meet outstanding orders	2,150 00
For public lamps to complete the order of the Com-	
mittee on Police - - - - -	1,495 99
For an additional supply of coal - - - - -	750 00
Making altogether	\$14,395 99

Which exceeds the whole capital by the sum of 7,755 dollars 4 cents ; besides which the accruing rents, salaries, and other incidental expenses not included in the estimate of the engineer, the trustees think will amount to about 4244 dollars 96 cents ; making in round numbers 12,000 dollars—which it is probable will be required over and above the original capital, to meet outstanding orders, and complete the works on the scale now contemplated.

In explanation of this apparent excess beyond the original estimate, it is proper to state that *that* did not include certain expenses which at first it was not thought expedient to undertake ; but which more reflection has satisfied the trustees should be regularly assumed by the Board, and an allowance for them obtained in the price of the gas sold. Nor did it include the heavy expenditure incurred in supplying the fixtures and lamps for the streets, which the ordinance requires of the trustees to provide without expense to the city. And the line of pipes, as originally proposed to be laid, has been greatly extended ; in some instances at the request of the city authorities, where new paving of the streets was about to be undertaken by them ; and in other cases at the request of persons who pledged themselves to become consumers of gas as soon as it could be furnished. Another considerable item included in the above account is the bituminous coal laid in for making gas. The items may severally be estimated as follows :—

Service pipes and meters	\$5,715 85
Extension of pipes in certain streets beyond original amount	6,333 00
150 public lamps and fixtures, at 20 dollars each	3,000 00
Stock of Coal	2,238 50
Expenses not estimated for	\$17,287 35

Thus it will be perceived that the expenditures upon the objects originally proposed, correspond very nearly with the estimates ; and that the actual cost of erecting the works is several thousand dollars less than the capital appropriated.

This result is the more satisfactory from the unlooked-for difficulties that were experienced in excavating the tanks, owing to the rocky and springy nature of the soil, which caused considerable additional expense ; and the entire change in the system of labour which occurred very soon after commencing operations. To Councils and the stockholders it is especially interesting, as it tests very fully the accuracy of the calculations upon which the enterprise was commenced.

The experimental apparatus erected at the works for the purpose of testing the quality of different samples of coal, has been in operation for several weeks, and gas enough manufactured for the use of the office and buildings on Schuylkill ; and the engineer is of opinion that a full supply for consumers can be furnished in a very few days.

The applications already upon the books of the trustees, will require an amount sufficient for twelve hundred argand burners, or about one-fourth of what can be manufactured by the present works ; and the trustees believe that before many months elapse, the demand will at least equal the whole capacity of the works.

By order of the Trustees,

R. M. HUSTON, *President.*

Philad. Jan. 26, 1836.

PROCEEDINGS

AND MINUTES OF THE STOCKHOLDERS.

At a meeting of the stockholders of the Philadelphia Gas Works, held on Tuesday, January 26th, 1836—

On motion of Mr. Fraley,

James Taylor, Esq. was called to the chair, and

John Thomas was appointed secretary.

Dr. Huston, President of the Board of Trustees of the Gas Works, read a report of the trustees, which, on motion of Lemuel Lamb, Esq. was accepted.

W. H. Keating, Esq., from a committee of the trustees, made some remarks as to the course deemed expedient by the Board in regard to the means of carrying the works into operation.

Dennis M'Credy, Esq., then offered the following resolution, which was adopted:—

Resolved, That the trustees of the Philadelphia Gas Works be requested, with the consent of the Select and Common Councils, to issue two hundred and fifty additional shares of stock, divided into quarter shares; the said quarter shares to be divided pro rata among the holders of the original stock. But if any stockholder shall decline accepting his proportion, the same to be sold at auction, and the proceeds carried to account of the works.

On calling the names of the stockholders, persons whose stock amounted to seven hundred and forty shares, answered to their names.

On motion of Dennis M'Credy, Esq.,

Resolved, That the thanks of the stockholders present, be tendered to the Trustees and Engineer of the Gas Works, for their attention to the duties of their office.

On motion of Mr. Lamb,

Adjourned.

JAMES TAYLOR, *Chairman*.

JOHN THOMAS, *Secretary*.

APPLICATION OF THE STOCKHOLDERS TO THE TRUSTEES.

The undersigned stockholders of the Philadelphia Gas Works, holders of the number of shares affixed to their names respectively, hereby apply to the trustees of the Philadelphia Gas Works, requesting them, with the consent of the Select and Common Councils, to receive subscriptions for an additional number of shares, not exceeding two hundred and fifty in the whole, upon the terms of a resolution passed by the stockholders, at a meeting held on the 26th of January, 1836.

NAMES	Number of Shares
Lemuel Lamb - - - - -	106
Henry D. Cook - - - - -	1
Robert Ewing - - - - -	11
W. F. Fotterall - - - - -	243
Benjamin Jones, Jr. - - - - -	4
George Thompson, C. - - - - -	2
Jacob Alter - - - - -	65
Joseph Lesley - - - - -	13
Robert R. Dorsey, per Joseph Lesley, attorney,	20
Robert Willis, - - - - -	20
Samuel C. Atkinson - - - - -	8
Charles P. Massey - - - - -	30
R. W. Mason - - - - -	7
George Gardom - - - - -	1
John Hockley - - - - -	20
H. C. Salaignac - - - - -	17
Isaac Parrish - - - - -	2
Saml. C. Bunting - - - - -	2
Isaac Dunton - - - - -	27
William Greaves - - - - -	1
Miles N. Carpenter - - - - -	5
Dennis M'Credy - - - - -	17
James B. Hutchinson - - - - -	1
S. V. Merrick - - - - -	4
Geo. W. Ash - - - - -	40
Thomas Graham - - - - -	4
Claus Winters - - - - -	7
James Taylor - - - - -	6

NAMES							Number of Shares.
John Fausset	-	-	-	-	-	-	14
Fred. Fraley	-	-	-	-	-	-	8
John R. Latimer	-	-	-	-	-	-	5
John Thomas	-	-	-	-	-	-	1
Frederick Brown	-	-	-	-	-	-	10
G. Emerson	-	-	-	-	-	-	12
B. P. Smith, clerk for Geo. Powell & Co., owners							51
George Powell	-	-	-	-	-	-	3
Samuel D. Breed	-	-	-	-	-	-	1
Charles F. Lex	-	-	-	-	-	-	11
Geo. Troutman	-	-	-	-	-	-	20
James Martin, per John Thomas	-	-	-	-	-	-	1
John W. Horner	-	-	-	-	-	-	7

SECOND ANNUAL REPORT

OF THE

TRUSTEES OF THE PHILADELPHIA GAS WORKS.

JANUARY 19, 1837.

To the Select and Common Councils of the City of Philadelphia.

THE Trustees of the Philadelphia Gas Works, in compliance with the provisions of the ordinances under which they act, submit the following report of their proceedings, and an account of their receipts and expenditures for the past year. With the capital of one hundred and twenty-five thousand dollars which was placed at their disposal for the construction of the Gas Works, the necessary buildings and apparatus for the manufacture of gas, with gas-holders for its storage, and an office, and work-shops, have been erected on the lot belonging to the City, between High and Filbert streets, on the Schuylkill; nearly eight miles of iron mains have been carried through central parts of the city, and 268 buildings and 165 public lamps are now supplied with gas by branches connected with the street mains, and attached to meters placed within the walls of the buildings intended to be lighted.

The expenditures for the accomplishment of these objects have entirely exhausted the capital paid in; one hundred and twenty-five quarter shares of the additional stock remaining undisposed of, and the engagements of the trustees for a supply of coal for the operation of the works, and for the completion of the apparatus, have compelled them to fix a time when they must cease taking customers, from their inability to furnish service pipes and meters, which it was deemed proper to supply out of the capital. On the eighth of February last, the works were so far completed as to commence the manufacture of gas, and on the tenth of the same month, the

pipes of conduit were filled, and the public lamps in Second street lighted. Owing to the tardiness with which those engaged in putting up the fittings for private burning proceeded with their work, only two premises were at that time prepared for the introduction of gas, and the whole demand on the establishment amounted to nineteen private, and forty-six public burners. From the 8th of February to the 1st of September, the operations of the trustees were necessarily unprofitable; owing to the irregularity of the demand during the summer months, the great proportion of the public burners which are not constantly lighted, the increased wear and tear of the apparatus by throwing portions out of work, and to the fixed expenses being nearly the same whether a large or small quantity of gas is made. The receipts for gas from February 10th to April 1st, were \$829 48; from April 1st to June 1st, \$1724; from June 1st to September 1st, \$3112 42; and for the quarter ending December 1st, \$8061 23.—From the 1st of September, 1836, the demand has been sufficient to give profitable employment to the works, and the present daily consumption of gas is about forty-two thousand cubic feet, supplied to 2800 private and 165 public burners. Fifteen retorts for the carbonization of the coal are now in use, and the works have the capacity to supply about seventy-five thousand cubic feet per day, which, with a small addition to the present capital may readily be distributed and sold in those parts of the city where the pipes are already put down. The trustees hope that by the acceptance of the ordinance recently passed by Councils, the stockholders will give them the means of effecting this, and extending the benefits of the Gas Works to other portions of the city, at the same time that they will insure to themselves a fair remuneration for the amount so liberally placed at the command of the corporation for the interesting experiment which has now been so successfully made. The Works are built in the most substantial manner, and for the perfection and economy of their operation are certainly unrivaled in this country; the rapidity with which they were constructed, and the complete adaptation of every part of the apparatus to its intended purpose, reflect the highest credit on the engineer, Samuel V. Merrick, Esq., whose faithfulness and ability in discharging the arduous and novel duties of the undertaking, it gives us much pleasure thus publicly to notice. The gas is obtained exclusively from bituminous coal, and the coke produced by its carbonization is used at

present as the principal fuel ; considerable quantities of this residuum are sold for manufacturing and domestic purposes, and when the sale of it is more extended, anthracite coal will be introduced as the fuel for making gas.

The trustees respectfully refer to the accounts hereto annexed for the details of their receipts and expenditures, and would suggest that they should be placed in charge of a committee of Councils, for the purpose of being audited.

In conclusion, the trustees congratulate the Councils and their fellow citizens on the complete success of the enterprise placed in their charge, for, independently of the increased cleanliness and comfort which have been obtained by the introduction of gas lighting into our stores and dwellings, and the security afforded against accidents in the public streets in which the same means are employed for illumination, its value as an auxiliary to the police for the prevention of crime, makes it very desirable that the whole city should participate in its advantages.

By order of the trustees,

R. M. HUSTON, *President.*

*Attest—*WM. FENNELL, *Register.*

Philadelphia, January 19th, 1837.

Amount of Cash received by the Trustees of the Philadelphia Gas Works from March 21st, 1835, to January 1st, 1837.

For capital stock paid in	-	-	-	-	\$121,875 00
Consumption of gas,	-	-	-	-	13,727 13
Sales of coke, coal, tar, &c.,	-	-	-	-	2,507 58
“ Service pipes, stop cocks, &c.,	-	-	-	-	1,279 11
					\$139,388 82

Amount of Cash paid by the Trustees, &c..

For construction of works,	-	-	-	-	\$64,659 82
Distribution pipes,	-	-	-	-	44,862 00
Service pipes, Meters, &c.,	-	-	-	-	12,064 94
Public lamps,	-	-	-	-	2,591 40
Expenses of coal, freights, rents, salaries, wages to workmen, and incidental expenses,					14,244 09
Balance—Cash on hand,	-	-	-	-	\$851 92
City Treasurer,	-	-	-	-	114 65
					966 57
					\$139,388 82

January 1st, 1837.

COMMUNICATION

FROM THE

PRESIDENT OF THE TRUSTEES OF THE GAS WORKS TO
THE CITY COUNCILS—ENCLOSING PROCEEDINGS AND MI-
NUTES OF THE STOCKHOLDERS.

JANUARY 25, 1837.

To the Select and Common Councils of the City of Philadelphia.

GENTLEMEN:—

I herewith inclose the proceedings of the Stockholders in the Philadelphia Gas Works, at a meeting convened by public notice, to consider the ordinance of Councils, recently passed, for an extension of the works, from which it will be observed that its provisions were unanimously agreed to.

I also enclose a written declaration to the same effect, signed by a majority of the stockholders in their individual capacities.

Very respectfully,

R. M. HUSTON,

President of Trustees Philadelphia Gas Works.

Philadelphia, January 25th, 1837.

At a meeting of the stockholders of the Philadelphia Gas Works, held at the Franklin Institute, on the 13th inst., for the purpose of considering the propriety of accepting the ordinance passed on the 22d day of December, 1836, by the Select and Common Councils, for the extension of said Works, Mr. James Taylor in the Chair, J. K. Eyre, Secretary. After statements of the present condition and prospects of the works had been made by Dr. Huston, the President of the Board of Trustees, and Messrs. Fraley and Keating, on motion of Mr. Fraley, it was unanimously *Resolved*, that the terms and conditions imposed by an ordinance passed 22d Decem-

ber, 1836, by the Select and Common Councils of Philadelphia, for the extension of the Philadelphia Gas Works, be, and the same are hereby accepted, and that the Board of Trustees be requested to prepare a certificate of such acceptance, and receive the signatures of the stockholders of the Philadelphia Gas Works thereto, in order that the same may be presented to the Select and Common Councils within the time required by the ordinance aforesaid.

On motion of Mr. M'Credy, it was unanimously resolved that the thanks of the stockholders be presented to the trustees of said works, for their judicious management.

On motion, adjourned.

JAMES TAYLOR, *Chairman.*

J. K. EYRE, *Secretary.*

We, the subscribers, stockholders in the Philadelphia Gas Works, do hereby agree to the terms and provisions of the ordinance passed by the Select and Common Councils of the City of Philadelphia, on the twenty-second day of December, entitled an Ordinance for the Extension of the Philadelphia Gas Works.

NAMES										Number of Shares.	
Jacob Alter,	-	-	-	-	-	-	-	-	-	81	$\frac{1}{4}$
Thomas Graham,	-	-	-	-	-	-	-	-	-	5	
James Taylor,	-	-	-	-	-	-	-	-	-	7	$\frac{3}{4}$
Samuel C. Bunting,	-	-	-	-	-	-	-	-	-	5	$\frac{1}{2}$
George Thomson,	-	-	-	-	-	-	-	-	-	12	$\frac{1}{2}$
Frederick Brown,	-	-	-	-	-	-	-	-	-	12	$\frac{1}{2}$
Alexander M'Clurg,	-	-	-	-	-	-	-	-	-	7	$\frac{1}{2}$
Isaac Dunton, by his attorney, Wm. B. Cooper,										33	$\frac{3}{4}$
John Fausset,	-	-	-	-	-	-	-	-	-	17	$\frac{1}{2}$
A. C. Salaignac,	-	-	-	-	-	-	-	-	-	21	$\frac{1}{4}$
John R. Latimer,	-	-	-	-	-	-	-	-	-	6	$\frac{1}{4}$
F. Fraley,	-	-	-	-	-	-	-	-	-	10	
R. M. Huston,	-	-	-	-	-	-	-	-	-	6	
S. V. Merrick,	-	-	-	-	-	-	-	-	-	5	
John M. Lisle, by his attorney, John Lisle,	-	-								70	
James Taylor, attorney for the Philadelphia Saving Fund Society,	-	-	-	-	-	-	-	-	-	7	$\frac{1}{2}$

NAMES						Number of Shares.	
Samuel D. Breed,	-	-	-	-	-	-	$1\frac{1}{4}$
Benjamin Jones, Jr.,	-	-	-	-	-	-	5
George Gardom,	-	-	-	-	-	-	$1\frac{1}{4}$
Isaac Parrish,	-	-	-	-	-	-	$2\frac{1}{2}$
John Hockley,	-	-	-	-	-	-	75
John Thomas,	-	-	-	-	-	-	$1\frac{1}{4}$
Grace Brannan, in trust for Elizabeth Faries,	-	-	-	-	-	-	30
G. Emerson,	-	-	-	-	-	-	15
H. R. Davis,	-	-	-	-	-	-	2
George Troutman,	-	-	-	-	-	-	25
John W. Horner,	-	-	-	-	-	-	$8\frac{3}{4}$
Nathan Trotter,	-	-	-	-	-	-	$17\frac{1}{2}$
Charles Pryor Massey,	-	-	-	-	-	-	$37\frac{1}{2}$
Isaac Collins,	-	-	-	-	-	-	12
Richard Higgs,	-	-	-	-	-	-	$3\frac{3}{4}$
Thomas Biddle & Co.,	-	-	-	-	-	-	56
Claus Winters,	-	-	-	-	-	-	$8\frac{3}{4}$
Joseph Lesley,	-	-	-	-	-	-	13
Robert R. Dorsey, by Joseph Leslie, attorney,	-	-	-	-	-	-	20
Miles N. Carpenter,	-	-	-	-	-	-	$6\frac{1}{4}$
J. Nevins,	-	-	-	-	-	-	62
R. W. Mason, by A. G. Jaudon, attorney,	-	-	-	-	-	-	17
C. R. Thomson & Co.,	-	-	-	-	-	-	11
Wm. W. Abbott,	-	-	-	-	-	-	$2\frac{1}{2}$
Robert Ewing,	-	-	-	-	-	-	$2\frac{3}{4}$
James H. Hutchinson,	-	-	-	-	-	-	$1\frac{1}{4}$
John H. Vinck,	-	-	-	-	-	-	$1\frac{1}{4}$
Charles H. Kirk,	-	-	-	-	-	-	$1\frac{1}{4}$
J. Pancoast,	-	-	-	-	-	-	$2\frac{1}{2}$
J. Culp, per Samuel C. Bunting, per order,	-	-	-	-	-	-	$2\frac{1}{2}$
R. M. Huston, president of trustees,	-	-	-	-	-	-	$31\frac{1}{4}$
Total,							<u>786$\frac{1}{4}$</u>

THIRD
ANNUAL REPORT

OF THE
TRUSTEES OF THE PHILADELPHIA GAS WORKS.

JANUARY 15, 1838.

To the Select and Common Councils of the City of Philadelphia.

THE Trustees of the PHILADELPHIA GAS WORKS, in compliance with the provisions of the fourth section of an ordinance, for the construction and management of the Philadelphia Gas Works, enacted on the 21st day of March, 1835,

Respectfully submit,

An accurate account of their receipts and disbursements, together with a statement of their proceedings during the past year. These will be comprised under the following heads:—

- 1st. Of the manufacture of Gas during the year 1837.
- 2d. Of the extensions and improvements undertaken during that year.
- 3d. Of contemplated improvements and extensions.
- 4th. Of the Finances of the Company.
- 5th. Miscellaneous observations.

FIRST.—*Of the manufacture of Gas during the year 1837.*

The trustees have pleasure in reporting that the manufacture of gas has been uninterrupted during the whole year; and that no accident has occurred, and no cause of complaint has been given, either as to the quality or supply of gas.

The following table exhibits a comparative statement of the quantity made during the years 1836 and 1837; and will show the rapid increase in the consumption, which almost entirely counteracted the reduction naturally expected during the summer months:—

Gas was first made at the Works on the 8th of February, 1836; since which, there was made,

	In 1836.	In 1837.
January,	_____	1,156,400 cubic feet.
February,	205,200	1,006,200
March,	359,000	1,306,100
April,	362,300	1,104,400
May,	453,200	960,400
June,	361,600	866,400
July,	353,200	903,100
August,	442,300	1,078,100
September,	658,700	1,517,800
October,	921,200	2,119,700
November,	1,111,000	2,418,100
December,	1,253,600	2,642,000
Total,—	<u>6,481,300</u>	<u>17,078,700</u>

The capacity of the Works now in operation is equal to the manufacture of 110,000 cubic feet in twenty-four hours.

The daily consumption at this time, varies from 90,000 to 100,000 cubic feet.

The greatest consumption in any one day, up to the present time, has been 105,000 cubic feet.

The number of consumers at this time, is 670.

The total number of burners now supplied, is 6,814.

The public lamps supplied with gas amount to 301.

There are at this time four gasometers, all in good order for working, whose contents equal 140,000 cubic feet.

The annexed statement A, shows the monthly increase in the

number of consumers and of burners, since the commencement of the operations.

SECOND.—*Of the extensions and improvements undertaken during the year 1837.*

The works were originally commenced on a plan which admitted of a regular and symmetrical extension, as necessity would justify.

In the year 1835, the first section of the works was commenced, and consisted of a retort-house, capable of receiving thirty retorts, of the requisite purifiers, condensers, coolers; of two gasometers for the storage of gas; of an office and workshops;—and were stated in the last annual report, as having a capacity to supply about 75,000 cubic feet per day. By adding to the number of retorts, and by judicious improvements resulting from increased experience, that section of the works has been brought to be equal to a supply of 110,000 cubic feet per day.

The second section of the works, was commenced immediately after the acceptance by the stockholders of the ordinance for the extension of the Philadelphia Gas Works, passed on the 22d of December, 1836, and accepted by them on the 25th of January, 1837.

The extension has consisted in the enlargement of the retort-house, sufficiently to contain sixty additional retorts; of these, thirty have been constructed, and are ready for use. These, with the thirty already in operation, will suffice for the manufacture of 220,000 cubic feet in twenty-four hours. The rest of the retorts may be put in at any time hereafter, when required.

By a slight alteration in the disposition of the benches of retorts, erected in 1835, more space may be obtained—so that the house will be capable of receiving 120 retorts, which are sufficient to manufacture upwards of 400,000 cubic feet of gas every twenty-four hours.

The building originally used as a lime-house has been fitted up for the purifiers of the second section, and the necessary apparatus for washing, cooling, and condensing the gas, has been doubled.

Two new gasometers of equal size with those previously constructed have been completed.

Extensive coal stores, capable of receiving 100,000 bushels of coal have been constructed, and will contain a stock equivalent to a six months consumption of coal, for the probable manufacture of

gas, during the next winter. A substantial brick wall has been constructed, so as to protect the buildings.

The cost of the new works was estimated by the superintendent, as follows:—

	AMOUNT PAID.	AMOUNT DUE.	TOTAL.
Stone,	\$2,423 15	\$1,200 00	\$3,623 15
Brick,	3,310 15	698 98	4,009 13
Lumber,	2,233 50	—	2,233 50
Castings, &c.,	13,678 06	3,700 00	17,378 06
Roof materials,	2,250 92	—	2,250 92
Masonry,	9,000 00	1,212 89	10,212 89
Excavating Tanks,	1,796 93	—	1,796 93
Gasometers,	6,000 00	4,000 00	10,000 00
Wages of Hands,	8,941 19	1,500 00	10,441 19
Sundries,	2,827 68	1,850 00	4,677 68
Fire Bricks,	—	1,442 65	1,442 65
Total amount of pre- sent extension.	\$52,461 58	\$15,604 52	\$68,066 10

There was also paid last spring in order to complete
the old works, the sum of - - - - \$2,138 43

Making the total amount expended in completing
and extending the works, \$70,204 53

The distribution or system of main pipes in the streets has received great extensions during the past year.

The number and size of the pipes is as follows—

10 inch pipe	18 feet
6 do do	6,984 “
4 do do	4,302 “
3 do do	13,068 “
2 do do	3,468 “

27,840 feet or 5¼ miles.

To which add pipes laid
in 1835 and 1836, 41,603 feet, or 7¾ miles.

69,443 feet, or 13 miles.

The number of public street lamps erected at the expense of the
Company, in 1835 and 1836, was 157

To which were added in 1837, 143

300

for which, (in accordance with the provisions of the fifth section of

the ordinance of March 21st, 1835,) the fixtures and meters (being approved by the appropriate committee of Councils) were provided by the trustees without expense to the city corporation, and have been regularly supplied at one half the price paid by private consumers.

The increased number of consumers has necessarily called for a large expenditure in meters and services. Notwithstanding the desire of the trustees to procure meters of American manufacture, they found themselves obliged to resort again to England for this year's supply.

The number imported in 1837 was 343.

The trustees have given every encouragement to those disposed to enter upon the manufacture of the article, in this city; and with a view to encourage private enterprise, have not yet commenced the manufacture of meters themselves, although experiencing some inconvenience from the want of a regular supply at home.

The annexed presents a statement of the capital invested and required to complete the extensions of 1837.

	AMOUNT PAID.	AMOUNT DUE.	TOTAL.
On works,	\$54,600 01	\$15,604 52	70,204 53
On distribution,	25,859 76	3,400 00	29,259 76
On services,	11,728 50	3,700 00	15,428 50
On public lamps,	2,146 52	1,741 54	3,888 06
	\$94,334 79	\$24,446 06	\$118,780 85

The trustees have sufficient means to meet the amounts outstanding, and which it is expected will be liquidated in the course of a month.

THIRD.—*Of contemplated extensions and improvements.*

The Works being now considered adequate to the daily supply of from 200,000 to 220,000 cubic feet,—the trustees are however unable at this time to satisfy applications to that extent, because the large ten inch main, which conveys the gas along Filbert street from the Works to the centre of the city, appears to be full, and cannot be made to convey a much larger quantity without increasing the pressure upon the gas, beyond what appears to be the proper degree.

We have, therefore, reached the point, foreseen by Mr. Merrick in his original plan, when it becomes necessary to lay a second large main.

According to that plan, this should be laid in Spruce street; and the trustees are convinced of the indispensable necessity of proceeding as soon as possible, to lay a ten or twelve-inch main (and the latter would be preferred) along Spruce street, from Ashton street to the Delaware.—This should be connected with the Works by a sixteen inch main laid along Ashton street. The increased size of the pipes in Ashton street, is intended to admit of its being tapped at all the intersections of the east and west streets, by four and six-inch mains, to supply the consumption in all those streets west of Delaware Ninth street. It would seem desirable, also, to lay a six-inch and a four-inch main in Arch street, for an analogous purpose.

Until this additional main be laid, the trustees, not deeming it proper to undertake to supply an additional number of customers, were very reluctantly compelled to pass a resolution on the fifteenth of December last, temporarily closing their book of applications. They trust, however, that the measure so much to be regretted, on all accounts, will be but of short duration, and that Councils will soon put in their hands the means of further extending the usefulness of the Works.

The four gasometers will contain 140,000 cubic feet, and might, therefore, with close attention and care, suffice to accommodate a daily consumption of 220,000 cubic feet; but experience proves that it is both safer and more economical to have ample gas room, and to be able to store at least one day's supply. The trustees, therefore, conceive that it is essential to have two additional gasometers built; the expense of which is estimated at twenty-five thousand dollars.

The trustees have for some time past been impressed with the conviction that with a view to accommodate the eastern front of the city, it was desirable that a station should be provided at some low point along the Delaware front, where a gasometer should be constructed, which being filled by the mains during the day, would afford a steadier supply to the lower parts of the city, than when they have to receive it from mains that are tapped at night in so many places. The construction of this gasometer would cost about

\$15,000, independent of any expense attending the procuring a suitable site for it.

The expenditure of the past season for services and meters, has been nearly \$15,500.—An equal amount will probably be required during the present year, should the increased consumption keep pace with that of 1837, of which there is but little doubt if the trustees should be justified in receiving applications.

Although the establishment is at present in very good working order, still provisions should be made for repairs, which in the incipient state of the Works especially, are more expensive than they will be hereafter.

The iron roof of the retort house was so long exposed to atmospheric influences, when first constructed, that it had already commenced to rust before the manufacture of gas supplied the tar necessary to the coating of it. From this circumstance, the gas tar did not adhere to it, so as to afford the requisite protection, and it now requires very extensive repairs. These, though not unexpected, materially encroach upon the profit account of the Company; but provision has been made out of the present funds to meet this expenditure, which is charged to current expenses and not to capital.

In like manner the first gasometer made was (as was stated in last year's report) very unsatisfactory, and will soon require thorough renovation. The funds for this object are also provided from current expenses.

The constant occupation of the superintendent, in attending to the extension, has compelled him to postpone the experiments which he proposes to make with clay retorts. Until these are made, the iron ones must be used, notwithstanding their great tear and wear.

FOURTH.—*Of the Finances of the Company.*

The capital had been all expended during the year 1836, with the exception of the thirty-one and a quarter shares, that remained with the trustees. These could have been advantageously disposed of, had it not been for the restriction in the first section of the ordinance of the 28th January, 1836, which provides that they shall be sold at auction.

The difficulty of realizing, at any time, the true market value of stocks sold in this manner, has prevented the sale of more than ten shares, which were parted with on advantageous terms.

The balance remains unsold, to the amount of twenty-one and a quarter shares; and it is respectfully suggested to Councils, to remove the restriction, and to allow the trustees to dispose of them in such manner as they may deem most advantageous.

Of the loan authorized by the ordinance of the 22d of December, 1836, portions have been sold from time to time, as the trustees required it; and they have strictly complied with the provisions of that ordinance, by "Setting apart and reserving out of the moneys received by them from the manufacture and sale of gas, the sum of eight per centum per annum on the amount of the certificates, issued by virtue of that ordinance, before declaring and distributing among the stockholders any dividend of the profits of the said works."

This fund amounted on the 1st of January, 1838, after deducting the interest due that day, to \$1,327 67. This amount has been invested in the City Gas Loan itself; this being believed to be the safest and best investment that could be made of it.

The dividends heretofore made amount to eight per centum, of which four per centum was declared on the 1st of February, and four per centum on the 1st of August, 1837.

The stock, although promising a fair remuneration to the holders, has not yet paid them even the common legal interest. Since the average date of the payment of the several instalments on the capital, was the 23d of August, 1835, and they have received altogether, but eight per cent.

Another semi-annual dividend will probably be made on the 1st of February next.

The annexed statement B, is the cash account of the trustees, from the commencement of their operations to the first instant.

The proceeds of so much of the loan authorized in 1837, as has been sold, amount to \$109,078 11.

The amount required to pay the sums still due upon the Works, and the other liabilities of the Company, will be about forty thousand dollars, so that there will remain but little, if any, surplus for the purpose of making extensions this year, and to supply the working capital required for future operations. These are estimated by the superintendent as follows:—

(In the estimate the materials are taken at the present prices, which are probably as low as they will be in the spring.)

16 inch main in Ashton street, from Gas		
Works to Spruce street, 2,400 feet,	\$8,500	
12 branches, \$300—laying 2,400 feet		
\$1,200 - - - - -	1,500	
	—	\$10,000
12 inch main in Spruce st., from Ashton		
street to Delaware Second st., 11,000 ft.	\$23,000	
50 branches \$900—laying 11,000 feet,		
\$4,600, - - - - -	5,500	
	—	28,500
6 and 4 inch mains in Chesnut and in Arch		
streets, from Ashton street, to Delaware		
Ninth st.—say for each street, \$10,000		20,000
Two additional gasometers at the Works,		25,000
A gasometer on the eastern front of the		
city, - - - - -		15,000
For services and meters in 1838, estimated		
as in 1837, - - - - -		15,500
For a working capital, - - - - -		25,000
For extensions of lateral pipes, from time to		
time, as may be required—say -		40,000
		—
		179,000
To which add 10 per cent for contingencies,		17,900
		—
Amount required, - - - - -		\$196,900
		=====

Or in round numbers, the sum of \$200,000 will be required in order to allow the Trustees to distribute all the gas that can be made at the present works, and for which there is a constantly increasing demand.

The Trustees, therefore, ask that they may be authorized to obtain, from time to time, by loan, such additional sums of money as they may require, not exceeding two hundred thousand dollars, in the manner provided for the first loan, and on condition that a similar reservation of eight per cent. shall be made for the purpose of paying interest and creating a sinking fund for the ultimate resumption of the loan.

FIFTH.—*Miscellaneous Observations.*

The manufacture of gas has now attained an extent and a reputation which justify its further distribution as rapidly as may be consistent with a judicious economy.

At first, it was used exclusively in stores and hotels ; at present, its consumption is extending rapidly. Besides the City Hall, State House, the public offices, the market houses, theatres, circus, all the public hotels, and most of the stores, on the line of the pipes, it is used with great advantage and satisfaction in several churches, and in private dwelling houses.

Applications to extend the pipes in streets, where private houses are more numerous than stores, have, heretofore, been necessarily declined, but should the funds now called for be supplied, it is probable that before another twelve months, many private houses will be lighted with it.

Our own experience confirms the statement made by Mr. Merrick in his report in 1834, that “ the extension of gas lights in private houses, is not so much the result of its cheapness, as a material for lighting ; but on account of its cleanliness, its safety and saving of labour.”

The Trustees take this opportunity of stating, that the gas has not, at any time failed ; and that in the few instances in which a temporary deficiency occurred, it has been ascertained to have been caused by a local defect in the internal tubes and burners (which are not put up by the Trustees, but by individual gas fitters,) or by the neglect of the consumer, in not keeping his meter supplied with water. The latter is so simple a precaution as to require only the most trifling attention ; but to remove even the possibility of inconvenience from this source, the Trustees have recently appointed a person to examine the meters from time to time. The defect in the fittings has occurred only in a few instances, and to obviate a recurrence of it, the Trustees have lately adopted a few simple regulations, which will, it is hoped, prevent any future disappointment. A copy of which is hereto annexed, marked C.

Several of the insurance companies directed that such buildings as were covered by policies from their offices should, before using gas, be provided with a stopcock, placed between the external wall of the building and the meter.

The Trustees believe this to be a good precaution, and request the

assent of Councils to a new regulation, providing that such a stop-cock shall be placed in all cases, and allowing them to charge the cost of the same to the consumer. They should also be allowed to charge in all cases where services are carried to a greater distance than the usual one of sixteen feet.

In conclusion the Trustees have to state, that Samuel V. Merrick, Esq., the able Engineer, who constructed the first section of the Works, having found that his continued attention to them interfered too much with his private engagements, tendered his resignation, which the Board reluctantly accepted on the 8th of February, 1837. As the extensions were about to be made, the trustees requested Mr. Merrick to devote, occasionally, to a general superintendence of the new Works so much of his time as he should be able to spare, or as might be deemed necessary in consultation with the superintendent. This duty has been performed to their utmost satisfaction, and the Trustees can only repeat here, their unqualified approbation of the conduct of that gentleman, and their admiration for the signal success which has attended the Works put up by him.

On signifying his resolution to resign, the Trustees elected as Superintendent of the Works, John C. Cresson, Esquire, a gentleman of great scientific attainments. No higher praise can be bestowed upon him than by observing, that since he took charge of the Works in March last, he has fully maintained for them the high reputation secured to them by his predecessor; and that the extensions and improvements constructed under his immediate superintendence are, in every respect, equal to the first section; and that the experience, acquired in our establishment, has been judiciously taken advantage of, to introduce valuable improvements.

In behalf of the Trustees of the Philadelphia Gas Works,

R. M. HUSTON, *President.*

Attest,—WILLIAM FENNELL, *Register.*

Philadelphia, January 15th, 1838.

(A)

	APPLICATIONS.		Transferred.	Discontinued.	Actual Consumers.	Burners added.	Total Burners in operation.
	New.	Total.					
1835.							
October,	18						
November,	20	38					
December,	32	70					
1836.							
January,	20	90					
February,	13	103		2	101	529	
March,	6	109			107	266	795
April,	11	120	1		117	515	1310
May,	15	135	1		131	156	1466
June,	12	147	1		142	139	1605
July,	13	160			155	135	1740
August,	33	193	2	1	185	196	1936
September,	35	228	2		218	241	2177
October,	41	269	3	2	254	379	2556
November,	16	285	1		269	145	2701
December,	16	301	4	4	277	251	2952
1837.							
January,	20	321	3		294	143	3095
February,	36	357		2	328	241	3336
March,	44	401	7	2	363	252	3588
April,	27	428	8	2	380	259	3845
May,	19	447	5	1	393	96	3941
June,	28	475	5	1	415	58	3999
July,	40	515	7	2	446	121	4120
August,	53	568	4	1	494	763	4883
September,	56	624	7	4	539	418	5301
October,	71	695	11	5	594	530	5831
November,	62	757	9	5	642	686	6517
December,*	41	798	13		670	297	6816
	798		94	38		6816	

* The Book of Applications, was closed on the 15th day of December, 1837.

(B)

DR. CASH ACCOUNT OF THE TRUSTEES OF THE PHILADELPHIA GAS WORKS. CR.

<i>Amounts received from 21st of March, 1835.</i>		<i>Amounts paid from 21st of March, 1835.</i>	
For Capital Stock paid in,	-	For construction of Works,	\$120,474 53
For sales of Loan Ist,	-	For distribution of Pipes,	71,163 05
For Bills payable,	-	For Service Meters, &c.	\$26,550 31
For consumption of Gas,	-	Received for Do,	5,784 00
For sales of Coke, Coal, Tar, &c.	-	For public Lamps,	20,766 31
	-		5,553 92
	-	Capital	
	-	For Manufacture of Gas, including cost of Coals, Freight, Wages, Salaries, and Rents,	
	-	For Dividends declared,	
	-	For interest on Loans,	
	-	For Sinking Fund,	
	-	Balance Cash on hand,	
	-		\$217,954 88
	-		57,313 51
	-		9,750 00
	-		3,983 00
	-		1,327 67
	-		16,547 38
	-		\$306,876 44

*Office of the Philadelphia Gas Works, }
January 1st, 1838.*

WM. FENNELL, Register,

DR.

SINKING FUND.

CR.

	1837	1838.	By Profit and Loss,		
September 6. To Sundries for amount invested,	\$330 00	January 1.	.	.	\$302 67
1838.		1838.	.	.	
January 16. Do.	990 00	January 1	Do.	.	1,019 00
Balance,	7 67			.	
	<u>\$1,327 67</u>				<u>\$1,327 44</u>
		1838.			<u>\$7 67</u>
		January 16	Balance.	.	

(C)

Size of Tubing.	Greatest length allowed.	Greatest Number of Burners.
$\frac{1}{4}$ inch	6 feet.	1 burner.
$\frac{3}{8}$ "	20 "	3 "
$\frac{1}{2}$ "	30 "	6 "
$\frac{5}{8}$ "	40 "	12 "
$\frac{3}{4}$ "	50 "	20 "
1 "	70 "	35 "
$1\frac{1}{4}$ "	100 "	60 "
$1\frac{1}{2}$ "	150 "	100 "
2	200 "	200 "

Size of Meters.	Greatest number of Burners.
3 light.	5 burners.
5 "	10 "
10 "	20 "
20 "	40 "
30 "	60 "
45 "	100 "
100 "	250 "

PROCEEDINGS**AND MINUTES OF THE STOCKHOLDERS.**

AT a meeting of the Stockholders in the Philadelphia Gas Works, held on the 22d of January, 1838 ; (agreeably to a call of the Trustees)—

Lemuel Lamb, Esq., was called to the Chair, and Benjamin Jones, Jr., appointed Secretary.

The meeting was addressed by a committee of the Trustees, consisting of the president, Dr. Huston, Wm. H. Keating, and John R. Latimer, Esqs. ; after which, the following resolutions were offered by Thomas Biddle and Dennis M'Credy, Esqs., and unanimously adopted : viz.

Resolved, That the Trustees be hereby authorized to appropriate the sum of six hundred dollars to be expended on the purchase of one or more pieces of plate ; to bear such inscription expressive of the approbation of the stockholders as they may think proper ; to be presented to Samuel V. Merrick, Esq.

Resolved, That the thanks of the stockholders are due, and are hereby tendered to the trustees for their arduous and devoted attention to the prosecution of the trust reposed in them.

Resolved, That the stockholders approve of the application by the trustees to Councils, for authority to borrow the additional sum of two hundred thousand dollars.

Adjourned.

LEMUEL LAMB, *Chairman.*

BENJAMIN JONES, JR., *Secretary.*

At a meeting of the stockholders of the Philadelphia Gas Works, held (in pursuance of invitation from the Trustees) on the 30th day of April, 1838.

James Taylor, Esq. was called to the chair, and Benjamin Jones, Jr., appointed Secretary.

On motion it was unanimously agreed, that the Stockholders accept of the ordinance passed on the 8th day of February, and the supplement thereto, passed on the 12th day of April, 1838.

JAMES TAYLOR, *Chairman.*

Attest—BENJAMIN JONES, JR. *Secretary.*

To the Select and Common Councils of the City of Philadelphia.

GENTLEMEN,

At a meeting of the Stockholders of the Philadelphia Gas Works, on the 30th ult., called by the Trustees for the purpose of considering the ordinance passed by Councils on the 8th day of February last, entitled “An Ordinance for the further extension of the Philadelphia Gas Works,” and the supplement to the same, passed on the 12th day of April last: The provisions of said Ordinance were *unanimously agreed to.* And in confirmation of these proceedings, I have now the honour of enclosing the required certificate, signed by the holders of one thousand and twenty-one and three quarter shares of stock, or a majority of more than four fifths of the whole.

Very respectfully

“Signed”

R. M. HUSTON, *President*
of Trustees, &c.

We the subscribers, Stockholders in the Philadelphia Gas Works, do hereby agree to the terms and provisions of the Ordinance, passed on the 8th day of February, 1838, entitled, "An Ordinance for the further extension of the Philadelphia Gas Works;" and also to a Supplement thereto, passed on the 12th day of April, 1838, by the Select and Common Councils of the City of Philadelphia.

NAMES.	Number of Shares.
Wm. F. Fotterall, - - - - -	205 $\frac{3}{4}$
Benjamin Jones, Jr., - - - - -	17 $\frac{1}{2}$
Thomas G. Connor, - - - - -	20
James Taylor, - - - - -	7 $\frac{1}{4}$
Isaac Collins, - - - - -	12
John R. Latimer, - - - - -	16 $\frac{1}{4}$
C. Bollmann, by Wm. H. Keating attorney, - -	2
V. M. Garesché, by Wm. H. Keating attorney, - -	24
Cooper & Dunton, by W. B. Cooper, - -	33 $\frac{3}{4}$
R. M. Huston, President for Trustees, - -	16 $\frac{1}{4}$
R. M. Huston, attorney for Ann Huston, - -	3
F. Fraley, - - - - -	10
John M. Richards, - - - - -	7 $\frac{1}{2}$
C. Stevenson, - - - - -	27 $\frac{1}{2}$
John Thomason, on the part of the Committee on Legacies and Trusts, - - - - -	35 $\frac{1}{4}$
James H. Cresson, - - - - -	84
Deborah Cresson, per James H. Cresson, - -	5
Claus Winters, - - - - -	8 $\frac{3}{4}$
Robert Hamilton, - - - - -	4
R. M. Huston, for Mary Huston, - - - - -	1
Samuel C. Atkinson, - - - - -	8
John P. Murta, - - - - -	1 $\frac{1}{4}$
John C. Hunter, - - - - -	6
George Gardom, - - - - -	1 $\frac{1}{4}$
Frederick Brown, - - - - -	12 $\frac{1}{2}$
Lemuel Lamb, - - - - -	36
Joseph Lesley, - - - - -	13
Robert Dorsey, per Joseph Lesley attorney, - -	20
John Thomas, - - - - -	1 $\frac{1}{4}$
Jas. Martin, per John Thomas, - - - - -	1 $\frac{1}{4}$

NAMES.							Number of Shares.
Dennis M'Credy,	-	-	-	-	-	-	21 $\frac{1}{2}$
John W. Horner,	-	-	-	-	-	-	8 $\frac{3}{4}$
E. L. Moss and D. Samuel,	-	-	-	-	-	-	21 $\frac{1}{2}$
Jacob Alter,	-	-	-	-	-	-	81 $\frac{1}{4}$
George Troutman,	-	-	-	-	-	-	30
A. C. Salaignac,	-	-	-	-	-	-	10 $\frac{1}{2}$
Joseph Trotter,	-	-	-	-	-	-	8 $\frac{3}{4}$
Wm. Davidson and Son,	-	-	-	-	-	-	10
Thomas Biddle, Trustee,	-	-	-	-	-	-	21
Thomas Sergeant,	-	-	-	-	-	-	24
John Fausset, Trustee,	-	-	-	-	-	-	17 $\frac{1}{2}$
Wm. Richardson,	-	-	-	-	-	-	17 $\frac{1}{2}$
Nathan Trotter,	-	-	-	-	-	-	8 $\frac{3}{4}$
Thomas Wickersham,	-	-	-	-	-	-	5
Thomas Wickersham and Son	-	-	-	-	-	-	13
Martin Lafler,	-	-	-	-	-	-	8
Lewis T. Pratt,	-	-	-	-	-	-	11
R. C. Maywood, per Lewis T. Pratt,	-	-	-	-	-	-	11
Francis R. Wharton,	-	-	-	-	-	-	28 $\frac{1}{2}$
Richard Higgs, per William Fennell,	-	-	-	-	-	-	10
William Ashdown, per William Fennell,	-	-	-	-	-	-	3
G. Emerson,	-	-	-	-	-	-	10

Shares represented

1,021 $\frac{3}{4}$

FOURTH
ANNUAL REPORT
OF THE
TRUSTEES OF THE PHILADELPHIA GAS WORKS.

To the Select and Common Councils of the City of Philadelphia:—

The Trustees of the Philadelphia Gas Works, in obedience to the provisions of the fourth section of the ordinance for the construction and management of the works, passed on the twenty-first day of March, A. D. 1835, respectfully present the following account of their proceedings, and of their receipts and disbursements during the past year.

The very full exposition of the objects and the plans of the Trustees, contained in their last annual report, together with the detailed account of their proceedings, up to the time which it embraced, render any thing, further than a brief statement of the transactions of the last year, unnecessary at the present time.

In that report it was particularly mentioned, that in order to meet the anticipated demand for gas, an augmentation of the capacity of the works, and a very great extension of the main pipes for distribution, would be required. These additions, especially in the number of retorts and purifiers, and the great mains along Ashton and Spruce Streets, with a large amount of pipes of smaller sizes, have been completed to the satisfaction of the Trustees; and it affords them pleasure to state, that the demand for the products of the works has more than fulfilled their anticipations. In proof of this, it may be observed, that the number of consumers has more than doubled within the

last year, while the quantity of gas made and sold has been in a corresponding ratio.

The works are now competent to the manufacture of two hundred thousand cubic feet daily, while the present daily consumption averages about one hundred and fifty thousand feet.

The annexed tabular statement contains a succinct view of this department of the works, and indicates the increase during the whole year, and in the several months.

TABLE.

Date.	Applications.		Transferred or Discontinued.	Consumers.	Number of Lights.		Public Lamps.	Cubic feet of Gas made.
	New.	Total.			Added.	Total.		
1838.		798	132	666		6814	301	23,560,000
January,	19	817	14	671	162	6976		2,430,000
February,	33	850	11	693	218	7194		1,980,000
March,	50	900	14	729	303	7497		2,064,000
April,	54	954	13	770	246	7743		1,918,000
May,	47	1001	9	808	145	7888		1,583,000
June,	62	1063	17	853	243	8131		1,471,000
July,	72	1135	8	917	323	8454		1,527,000
August,	87	1222	9	995	405	8859		1,669,000
September,	123	1345	30	1088	423	9282	381	2,095,000
October,	134	1479	13	1209	623	9905	400	2,857,000
November,	103	1582	14	1298	542	10447	434	3,387,000
December.	65	1647	22	1341	655	11102		4,376,000
	—	—	—	—	—	—	—	—
	849		306		4288			50,917,000

The amount and sizes of the main pipes, laid in the streets during the year 1838, are as follows :—

Sizes of Pipe.	Distance.
2 inch	150 feet.
3	15,660
4	14,409
6	9,036
10	27
12	10,881
16	2,340
	52,503 feet, say 10 miles.
Laid in former years,	69,425
	121,928 “ 23 miles.

The Register's accounts show the following statement of the receipts and disbursements during the year, and the amount expended in each department ; from which it will be perceived, that, while comparatively little has been expended on the works, a very large amount has been paid for the manufacture of gas, and pipes for its distribution.

DR. CASH ACCOUNT OF THE TRUSTEES OF THE PHILADELPHIA GAS WORKS. CR.

1838		Dolls. C.		Dolls. C.		
Jan. 1,	To balance of Cash, . . .	16547	38	By construction of Works, . . .	27304	62
	To sales of Capital Stock, . . .	2625	00	By distribution of Pipes, . . .	64769	65
	To sales of Loan 1st, . . .	49083	59	By services, meters, &c. 22424		65
	To sales of Loan 2d, . . .	82639	80	Received for do. . .	10255	67
	To sales of Gas, . . .	73161	21			
	To sales of Coke, &c. . .	6831	42	By Public Lamps, . . .	12168	98
					7850	64
				Capital, . . .	112093	89
				Manufacture of Gas, including cost		
				of coals, wages, salaries, rents,	71845	62
				By Dividends, . . .	14815	00
				By interest on Loans, . . .	6543	00
				By Bills payable, . . .	10000	00
				By profit and loss for interest, . . .	189	20
				Balance of Cash, . . .	15401	69
					230888	40
1839						
Jan. 1,	To balance, . . .					

The Sinking Fund Account is as follows :

DR.

1837. Sept. 7.	To Amount invested in Loan 1st,	.	.	\$300 00
	Premium on Loan, 10 per cent.,	.	.	30 00
1838. Jan. 16.	Amount invested in Loan 1st,	.	.	900 00
	Premium on Loan, 10 per cent.,	.	.	90 00
July 13.	Amount invested in Loan 1st,	.	.	1100 00
	Premium on Loan, 8 per cent.,	.	.	88 00
Aug. 18.	Amount invested in Loan 2d,	.	.	1600 00
Dec. 7.	Amount invested in Loan 2d,	.	.	1900 00
	Balance,	.	.	2573 47
				\$8581 47

CR.

1837. July 1.	By Appropriation, (as per ordinance) on sales of			
	Loans,	.	.	\$308 67
1838. Jan. 1.	Interest on Loans, held in trust,	.	.	9 00
	Appropriation on Sales of Loans,	.	.	1019 00
July 2.	do do	.	.	1178 00
3.	Interest on Loans, held in trust,	.	.	36 00
23.	Premium on Sales of Loan 2d,	.	.	1147 00
25.	do do do	.	.	458 80
Nov. 1.	do do do	.	.	1269 90
8.	do do do	.	.	597 60
17.	do do do	.	.	8 00
30.	do do do	.	.	49 50
1839. Jan. 1.	Appropriation on Sales of Loan,	.	.	2326 00
	Interest on Loans, held in trust,	.	.	174 00
				8581 47
1839. Jan. 1.	By Balance,	.	.	\$2573 47

On behalf of the Trustees of the Philadelphia Gas Works.

R. M. HUSTON, *President.*

Attest,—W^M. FENNELL, *Register.*

January 25th, 1839.

FIFTH

ANNUAL REPORT.

To the Select and Common Councils of the City of Philadelphia:—

The Trustees of the Philadelphia Gas Works respectfully submit the annual Report of their proceedings, and of their receipts and disbursements, required by the fourth section of an Ordinance for the construction and management of the Philadelphia Gas Works, enacted March 21st, 1835.

The quantity of Gas manufactured at the works, during the past year, has amounted to 39,473,000 cubic feet, being an increase over the corresponding quantity in the previous year, of 12,116,000 cubic feet, and over that of 1837, of 22,394,300 cubic feet. The capacity of the works is now adequate to the supply of 280,000 cubic feet during twenty-four hours, and the demand exceeds, from the average of the month of December, 170,000 feet. This is distributed through a line of pipes of nearly thirty miles in extent, and to two thousand and fifty-two consumers, using nearly sixteen thousand burners, besides the supply of five hundred and ninety-six public lamps.

The number of consumers has increased, during the last year, six hundred and forty-six, and the number of additional burners supplied, is five thousand three hundred and eighty.

The addition to the number of public lamps, (gas for which is furnished at half the price paid by private consumers,) has been one hundred and sixty-two. The particulars of these statements will be found in a table annexed to this report, and marked A.

In some of the streets where pipes are laid, the consumption of gas has probably nearly reached its highest point, but generally, (especially in those streets which are occupied by private dwellings) it is on the increase. The applications for the

extension of pipes, have been met as far as practicable, and extensions to the amount of nearly six miles and a half (33,475 feet,) have been made during the past year.

The particulars of these extensions will be found in table B.

As the extensions of the lines of pipes are made, it is obvious that the manufacturing capacity of the works, and the means of storage of gas, must be increased in a corresponding ratio. The size of the retort-house was doubled in 1838, so as to admit of the erection of four sections of retorts.

A third section of thirty retorts, with the corresponding washers, refrigerators, condensers, and purifiers, has been added during the past year. Four gasometers have also been added, making a capacity of storage equivalent to that of production per day.

It has been necessary to provide two additional station meters for measuring the products of the works thus increased.

Coal stores, capable of containing one hundred thousand bushels of coal, have been built, to the south of the present retort-house.

The sum thus invested during 1839, in permanent improvements, including the extensions of pipes before referred to, has been over one hundred and twelve thousand dollars, and has been supplied by the sale of the Loans authorized by the city councils.

The meters, furnished by one of our own fellow citizens, which have taken the place of those formerly imported, have thus far proved highly satisfactory, and, as yet, there has appeared no reason to doubt that they are equal to those introduced from abroad.

Experience proves, that to meet the demand of the public for the supply of gas, a large extension of the lines of pipes must be made annually. A corresponding increase in the means of manufacturing and storing gas is indispensable, and it is highly desirable that the preparations to meet this certain demand, should be made in due time.

On one occasion, in December, 1837, the consumption of gas nearly equalling the supply, it was necessary to close the books of the Trustees against further applications for gas, and a temporary alarm was created, lest the supply demanded by

the public wants, even upon old lines of pipes, could not be furnished.

The Loans authorized by the city councils have enabled the Trustees, up to this time, to guard against the recurrence of such a case, and to proceed steadily in extending the supplies upon old lines, and the laying of new; but it will be seen, from the statements in this report, that such a state of things cannot continue.

The present capacity of the works is less than 300,000 cubic feet; the daily demand nearly 200,000, and increasing in streets where pipes are already laid. The means of continuing these extensions, upon which the accommodation of the citizens depend, are wanting, and the Trustees have determined to request from Councils authority to raise a loan, to make the required additions to the works, and in the distribution of gas. These additions will require, according to the estimate of the Superintendent, John C. Cresson, Esq., in order to meet the demand for extensions, up to 1843,

For the extension of pipes for private consumers, and public lights, say	\$135,000 00
For Services, - - - -	75,000 00
Total for distribution,	210,000 00
Extension of the present Retort-house, and new section, with purifying apparatus and gasome- ters, say, for Works, - - -	75,000 00
Add, for Contingencies, - - -	15,000 00
Total,	\$300,000 00

The Trustees, therefore, ask that they may be authorized to obtain, from time to time, by loan, such additional sums of money as they may require, not exceeding in the whole, three hundred thousand dollars, in the manner provided for the first loan, and on condition that a similar reservation of eight per cent. per annum, shall be made, for the purpose of paying

interest, and creating a sinking fund for the ultimate redemption of the loan.

The Trustees herewith submit the Cash and Sinking Fund Accounts for the past year, marked respectively C and D.

The Trustees announce, with regret, the resignation, as President of the Board, of R. M. Huston, M. D., who has, from nearly the commencement of the operations of the works, devoted much time, and his well known abilities, to the service of the stockholders, and the public. Dr. Huston has been replaced by Thomas Cave, Esq., as President, pro tempore.

In behalf of the Trustees of the Philadelphia Gas Works.

THOMAS CAVE,

President, pro. tem.

ATTEST,—WM. FENNELL, *Register.*

TABLE. [A]

DATE.	No. of Applica- tions, Dec. 31st	Whole No. of Appli- cants. 1647	Discontinued.	No. of actual consumers.	Burners added.	Burners discon- tinued. 1355.	Total Burners.	Cubic feet of Gas made.
1838.			241	1406			10471	
1839.								
January,	53	1700	22	1437	634	123	10982	4,057,000
February,	75	1775	22	1490	655	96	11541	3,437,000
March,	78	1853	39	1529	519	202	11858	3,638,000
April,	87	1940	21	1595	634	188	12304	2,862,000
May,	74	2014	17	1652	650	112	12842	2,555,000
June,	94	2108	21	1725	530	130	13242	2,058,000
July,	60	2168	7	1778	376	35	13583	2,068,000
August,	87	2255	22	1843	514	125	13972	2,301,000
September,	102	2357	29	1916	689	156	14505	3,041,000
October,	79	2436	27	1968	823	217	15111	3,801,000
November,	91	2527	35	2024	936	490	15557	4,400,000
December,	66	2593	38	2052	721	427	15851	5,255,000
	946		300		7681	2301		39,473,000
						Made previously,		50,917,000
						Total,		90,390,000

PUBLIC LAMPS.

January 1st, 1839,	434
Do 1840,	162
	596

[B]

MAIN PIPE LAID IN STREETS IN 1839.

Sizes of Pipe.	Distance.
2 inch	1,704 feet.
3	11,629
4	11,997
6	4,419
8	3,726
	33,475
Previously laid,	121,928
Total of Mains,	155,403 feet, or $29\frac{2}{3}$ miles.

DR. CASH ACCOUNT OF THE TRUSTEES OF THE PHILADELPHIA GAS WORKS. CR.

		[C]	
		Dolls. C.	Dolls. C.
1839			
Jan. 1,	To balance of Cash, . . .	15401 69	
Dec. 31	To sales of Loan 2d, . . .	111257 19	
	To sales of Gas, . . .	103651 81	
	To sales of Coke, &c. . .	8658 37	
	Profit and loss for interest, . . .	1705 23	
	To Public Lamps, . . .	4380 00	
	To Bills payable, . . .	14915 00	
	By construction of Works, . . .		66852 03
	By distribution of Pipes, . . .		28669 14
	By services, meters, &c. . .		22544 19
	Received for do. . .		3308 13
	By Public Lamps, . . .		19236 06
	Manufacture of Gas, including cost of coals, wages, salaries, rents, . . .		1178 65
	By interest on Loans, . . .		91953 26
	By Dividends, . . .		15969 00
	By Bills receivable, . . .		14757 00
	Balance of Cash, . . .		2500 00
			18854 15
		259969 29	259969 29
1840			
Jan. 1,	To balance, . . .	18854 15	

SINKING FUND. [D]

DR.

1839. Jan. 1.	To Amount invested to this date, as per last statement,	\$6008 00
Jan. 30.	Amount invested in Loan 2d,	3400 00
March 22.	do do	2400 00
April 29.	do do	2000 00
July 27.	do do	4000 00
	Amount balance not invested,	4665 14
		\$22,473 14

CR.

1839. Jan. 1.	By Amount to credit of this account, as per last statement,	\$8581 47
15.	Premium on Sales of Loan 2d,	140 00
17.	do do do	525 00
30.	do do do	168 31
Feb. 2.	do do do	280 00
14.	do do do	1178 19
20.	do do do	134 65
20.	do do do	309 70
21.	do do do	80 79
28.	do do do	222 17
March 8.	do do do	26 93
18.	do do do	168 31
25.	do do do	1110 86
April 6.	do do do	471 28
10.	do do do	134 65
13.	do do do	134 65
19.	do do do	403 95
May 3.	do do do	21 00
9.	do do do	70 00
July 1.	Appropriation on amount of sales of Loans,	3227 00
1.	Interest on Loans, held in trust,	408 00
Oct. 15.	Premium on Sales of Loan 2d,	268 87
16.	do do do	391 36
Dec. 31.	Appropriation on amount of sales of Loans,	3488 00
	Interest on Loans, held in trust,	528 00
		\$22,473 14

Office of the Philadelphia Gas Works.

Attest,—WM. FENNELL, *Register*.*January 1st, 1840.*

REPORTS

MADE BY

COMMITTEES OF COUNCILS, &c.

PREVIOUS TO THE

Establishment of the Gas Works.

THE

REPORT

OF THE

COMMISSIONERS

OF THE

LAND OFFICE

FOR THE

YEAR 1861

IN

THE

STATE OF

NEW YORK

AND

THE

COUNTY OF

ALBANY

AND

THE

CITY OF

ALBANY

REPORT.

The Committee to whom was referred a resolution of Councils directing an inquiry into the expediency of lighting the City with Gas:—

Report—

That, impressed with the importance of the inquiry referred to them, not only as regards the amount of investment required to carry the project into successful operation, but the moral effect that must be produced by increasing the comfort, convenience and safety of the inhabitants—the Committee have bestowed great attention, and made minute inquiries, in order to be fully satisfied in their own minds of the propriety of the measure, before recommending any course to Councils in relation thereto.

In the course of their investigation they examined with care the establishments for the manufacture of gas now existing in Baltimore, New York, and Boston. In these cities carburetted hydrogen gas is made from different materials, and dissimilar apparatus; and they consequently have been enabled, by comparing the expense of each gas, taking into view their respective illuminating powers, and cost of apparatus, to determine the nature of the works which will be found most advantageous in the event of any system of gas lighting being adopted.

These investigations have resulted in a strong conviction on the minds of your Committee, of the great advantages that would result to the community, by the adoption of a system of public lighting, which they believe is far superior and more economical than that now pursued, and in this opinion they are supported, not only by their own observation, but by the

experience of every individual at all conversant with the subject.

In arriving at this conclusion, the Committee directed their attention—First, to a comparison between the economy of oil and gas as a means of illumination; Second, to the material from which gas may be produced with greatest advantage; Third, to the objections against gas works as dangerous and offensive; and Finally, to the proper location, and probable expense of construction.

To these points, severally, the attention of Councils is requested.

Comparison between Gas and Oil.

In treating on this subject it is not the intention of the Committee to enter into any estimate of the cost of manufacturing gas, for two reasons; First, because in the end any such estimate must prove fallacious, as the expense attending any species of manufacture, depends upon many contingencies which cannot be taken into account; and Secondly, it is deemed improper, after the candid manner in which these inquiries have been met by the gentlemen interested in gas works, to expose to public view any calculations tending to affect their interests. It is believed the end may be fully accomplished by comparing the selling prices of the several gases respectively, with oil, and showing the state of the concerns of those engaged in its manufacture, so far as it may be proper to make them public.

The Baltimore Company manufacture gas entirely from bituminous coal; the New York Company from rosin; and Mr. Robinson, of Boston, a gas from the two materials combined. The several estimates of value, as compared with oil, are, in the judgment of those concerned, as follows, viz.

Coal Gas—specific gravity = 400, at \$3 33½ per thousand cubic feet, is equivalent to oil at 66 2-3 cents per gallon. Rosin Gas—specific gravity = 750, \$7 00 per thousand cubic feet, is equivalent to oil at 80 cents per gallon. Combined Gas—specific gravity = 600, is equivalent to oil at 70 cents per gallon—or, in other words, 200 cubic feet of coal gas,

costing, at \$3 33½ per thousand, 66 2-3 cents—or 114 feet of rosin gas, at \$7 00 per thousand, 80 cents—or 140 feet combined, costing, at \$5 00 per thousand, 70 cents, will, respectively, give the same light in the same time, as one gallon of oil.

It should be borne in mind, in all inquiries respecting the illuminating powers of different bodies, that the quantity of light in the same time must be carefully considered. This remark is made for the reason that the Committee have found this circumstance generally overlooked. Frequently it has been observed to them by consumers, that gas light was quite, if not more expensive than oil, but when pressed upon the subject, acknowledged that their stores were better lighted, which readily accounted for the increased expense.

In taking the estimate of the comparative value of coal gas as here given, on the correctness of which all sources of information agree, it is very clear that the public lamps could be supplied with gas at a less expense by 33½ per cent. than with oil, the same quantity of light being obtained, provided the gas could be purchased at \$3 33½ per thousand. It becomes therefore a question to be determined by a view of the state of similar works, whether it would be a profitable undertaking to manufacture gas at city cost.

The Baltimore Company, the oldest in this country, and who may be considered the pioneers in gas works, both as to date and variety of experiments, originally constructed works for the manufacture of tar gas. This scheme totally failed, both as a source of profit to the manufacturers, and convenience to the consumers. The gas afforded being too offensive for endurance, these works were abandoned, and new works, for the use of coal, were constructed by an English engineer, on a plan now used in some parts of England. The second set of works have in their turn given place to others, which produce gas with greater economy, and are now in successful operation. Their gas is of an excellent quality, and notwithstanding the great expense they have incurred in bringing the works to perfection, and in addition, the circumstance of their gas being burnt (*ad libitum*) without, in many instances, any restrictions as to the quantity burnt for the

price paid, the stock of this Company is 35 per cent. above par, with a surplus fund, and paying 8 per cent. dividends. They furnish 3000 private, and 100 public lamps.

The New York Gas Company's works were originally constructed for oil gas. Finding the material too expensive, rosin was substituted. They too have had their difficulties to encounter, and prejudices to overcome. That their gas has forced itself into favour, is clearly demonstrated, by the fact, that they now light 10,000 private, and 376 public lamps:—under a contract with the corporation of the city to furnish gas for a certain burner specified, at the annual cost of oil expended on each of the residue of the city lamps, and which proves to give about five times the quantity of light that is afforded by each of the oil lamps upon which the price was predicated. The company are losers annually between four and five thousand dollars on this contract, and yet their stock is 46 per cent. in advance of the par price. They annually lay by a considerable surplus, and pay 10 per cent dividends.

The Boston gas works being private property, of course no notice of their profits can be taken.

If the prosperous condition of the several gas manufactories in this country, is not sufficient evidence of the profitableness of the manufacture, a reference to the offers made to former Councils, by men well versed in the routine of its manufacture, may set the question at rest. An individual offered a few years since, to light, free of cost, all the city lamps within the range of his pipes, in consideration of permission to lay the pipes in the streets.

Being satisfied, therefore, that the manufacture and sale of gas is a profitable business, and at the selling price it is cheaper than oil, it is perfectly clear that the gain to the city, by its introduction, will not only be the $33\frac{1}{3}$ per cent. difference between oil and gas at that price, but the difference between the cost of manufacture and the price at which it is sold, be that more or less. When, moreover, it is considered that the proportion of gas sold to individuals in other cities, is thirty private to one public burner, it is fair to presume, that the consumption of gas by the citizens of Philadelphia, will be suffi-

cient to reduce the cost of that used for city purposes, so as to materially diminish, if not annihilate, that portion of the now existing tax.

It remains but to make a single comparison of cost before leaving this subject.

During the month of December, a careful account has been kept by the captain of the watch, of the consumption of oil by one city lamp, an Argand burner with reflector. The result is, that the number of hours it burnt was 235, and the quantity consumed, measuring each filling carefully, was 3 gallons 1½ pint. The number of hours during which, in June, the lamps were lighted, was 121, and the average number of hours for each month was a hundred and seventy-eight, or per annum two thousand one hundred and thirty-six. The aggregate consumption of oil upon the experiment made, would be twenty-nine gallons per annum. No allowance is here made for waste or for the difference between the freedom of volatilization in the variations of temperature, the experiment being made at a low temperature, when a much less quantity of oil would be consumed than in warmer weather. The same officer reports, that for the common city lamps, he delivers to the watchmen thirty-six or thirty-eight charges of oil per annum, of one quart each, and for the Argand reflecting lamps at the same time one gallon for each. The comparison will therefore be founded on a consumption of thirty-gallons per annum. The cost therefore of sustaining one Argand reflecting lamp will be,

Thirty-six gallons of oil at \$1,	-	\$36 00
Extra attendance to watchmen, at 50 cents per		
month,	- - - - -	6 00
		\$42 00
One gallon of oil being equal to 200 feet of coal		
gas, a light of equal intensity would consume		
7,200 feet per annum at \$3 33½ per thousand		
cubic feet,	- - - - -	24 00
Saving on each reflecting lamp,	- - - - -	\$18 00

The common city lamps consume one fourth the quantity	
of oil, or 9 gallons, at \$1,	\$9 00
$\frac{1}{4}$ the quantity of gas, or 1800 feet, at \$3 33 $\frac{1}{3}$,	6 00
Saving on common lamp,	\$3 00

In considering the economy of gas, one important item should not be overlooked—the Committee refer to the expense and trouble incident to the attendance and cleansing oil lamps, and waste of oil. In large establishments where oil light is used, this is an onerous tax, which on the introduction of gas lights will be wholly done away with. The Committee have conversed with several large consumers, who have declared their willingness to pay fifty per cent. additional, rather than be deprived of a light so convenient and so clear.

The want of economy in the consumption of gas in Baltimore has been noticed; the consumers generally pay by the burner which is defined. Each consumer uses as much as can pass the apertures in the burner, and frauds are committed by enlarging them. Having no motive for economy, the lights are used as long as it may be convenient, and no attention is paid to saving the gas.

In New York and Boston, a different system has been adopted, by which the quantity consumed by each individual is accurately measured and charged accordingly. This is effected by an instrument called a metre, which is attached to the service pipe at the entrance of each house; this instrument is of tin, and of a cylindrical form, revolving in a case air tight of the same metal. The inner cylinder, which is composed of four apartments of given dimensions, revolves in water immersed to a point a little above the axis; each compartment has two openings, one for the admission, and the other for the emission of the gas. As the cylinder revolves by the pressure of the gas, the compartment rising out of the water fills, which displaces the water it contained, while the other descending, refills with water, the gas passing upward through a discharge pipe to the burners. The axle of the revolving cylinder operates upon gearing, to which clock hands are affixed, indicating on the dial the number of revolutions made, and conse-

quently, the capacity of the cylinder being previously ascertained, the quantity of gas consumed is measured. The adoption of this system tends to the advantage of all parties. The consumer pays for no more than he uses, and consequently burns with as much economy as is consistent with his interest, and the producer not subject to loss from carelessness or malice. The key of this metre is kept in possession of the manufacturer.

Material to be Used.

Various circumstances induced the Committee to select bituminous coal, as a material which may be used with greatest economy in the manufacture of gas. In the first instance, the gas made from it is less expensive; but this advantage is in some measure counterbalanced by the greater amount of investment required for its introduction. The coal gas being the lowest in the scale of illuminating powers, the same quantity of light will require a proportionate increase in quantity of material; of course more extended works for the production and larger mains for conduit, are required. Were there no other considerations, a question might arise.

All the products of coal gas are available for some useful purpose. The coke is a valuable fuel, and one for which a great demand will at once be created for manufacturing purposes. Each bushel distilled, will produce one and a quarter bushels of coke, which for manufacturing purposes is equivalent to a barrel of charcoal. The tar, of which one quart is produced from each bushel, finds a ready sale at both the existing works at three dollars per barrel; and the ammoniacal liquor, of which the same quantity of coal produces four gallons, is purchased by the chemists at half a cent per gallon. The value of the residuum of each bushel of coal, may therefore be estimated as follows:—

1½ bushels of coke, allowing for waste 20 per cent,—will net					
to customers one bushel at 15 cents,	-	-	-	-	15
1 quart of tar, net	-	-	-	-	2
4 gallons of ammoniacal liquor,	-	-	-	-	2
					—
					19 cts.
or very nearly the cost of the coal distilled.					—

On the other hand, rosin yields no residuum of any value as an article of sale, consequently the whole cost of the material must be paid out of the sale of gas.

Again :—The production of coal (a staple article of Pennsylvania commerce,) is unlimited, and when the improvements now being made are completed, the probabilities are more in favour of a reduction than of an advance in price. The increased demand occasioned by the consumption at the gas works, would not have the effect of enhancing the value of an article of so vast production as coal.

Rosin, on the contrary, is but a residuum in the manufacture of turpentine, consequently its production will be limited by the demand for turpentine, until the price is so advanced as to make it a primary object, in which case the cost of gas made from it, would far exceed that of coal gas. It is easy to predict the effect upon the market by the sudden creation of a demand so great as would be required for an article limited in its production, and already scarce.

In planning the works, it may be expedient, while the general arrangements are designed for coal gas, to provide for a few benches of rosin retorts, having a double object in so doing. A portion of rosin gas, mixed with that from coal, will much improve the brilliancy of the light produced. This of itself would not be a sufficient reason, but it is believed that such an arrangement will be conducive to economy, in making use of the oily matter evolved from rosin gas to mix with the fine coal and dust now lying refuse on our anthracite coal wharves, which it is probable would produce a fuel sufficiently inflammable for the use of the works, at an expense less than that at which other fuel could be procured.

Objections.

In the investigations of the Committee, their especial attention was called to the only objections of weight, that they believed could be urged against the proposed system.

Danger from explosions, and the offensiveness of the manufacture to the neighbouring inhabitants.

The first of these objections might almost be dismissed without discussion, when it is considered that the gas itself can not explode under any circumstances, without an admixture in certain proportions with atmospheric air, and that such an admixture cannot possibly take place to any great extent, either suddenly or without the knowledge of the workmen. The danger of explosion at the gasometer stations, is so remote as not to be worthy of a thought.

The only danger to be apprehended, is from leakage in pipes where they are enclosed in air-tight vaults or closets. And even here the very existence of the leak must be detected by the odour of the gas.

In evidence of the entire security which exists against such an evil, it may be remarked, that notwithstanding the immense extent to which the production of gas has been carried both in Europe and America, there has no instance come under the observation of the Committee, in which loss of life has been sustained in consequence of explosions. A Committee was appointed, who, after a patient investigation, and an examination upon oath of every distinguished, practical, and scientific individual they could find, versed in the art, reported against any parliamentary enactments on the subject. The danger from fire too, is much less in houses where gas is used, than oil. The insurance companies much prefer the former risk.

The remaining objection is to the offensive nature of the manufacture, and on this head the community have had great cause of complaint.

The nuisances complained of, arise from the discharge of the residuum and refuse lime water into the streets and sewers. The coal gas works are less liable to objection on this account, as the residuum is all stored away for sale, leaving the lime water only to be discharged, the manufactory itself being no more offensive than a foundry or large smith's shop, where much bituminous coal is consumed. The precaution lately adopted at Boston has overcome all difficulty. The lime water is discharged through an iron pipe into the river, under

tide water, and provision made to prevent its return up the neighbouring sewer upon the reflux of the tide. With this precaution no inconvenience is felt. All objections on the score of offensiveness, may be overcome by judicious arrangements in the construction of the works.

Location.

In determining the location of a manufactory in which large quantities of bulky material or fuel is required, the main circumstance to be considered, is the facility of placing the material at the works; and of course it should be located as near to navigation as possible; believing that it would not be judicious to seek a location without the limits of the city. Two sites only present themselves; the one, in Drawbridge lot, the other, below the bridge on the Schuylkill. The first of these would in many respects be preferable, but considering the value of the property, the whole of which would be required, it might perhaps be more economical to incur the expense of a transit main to the Delaware front, and establish the works on the lot bounded by Chesnut, Front, and Beach streets, and provide on the Delaware front sufficient gasometer room to supply the eastern plane with gas during the night, which had been made and transmitted from the works in the day time.

This main would require to be separate and disconnected from the pipes from which the gas is taken for consumption, because it would be so unequal in the several parts of its elevation and depression, that no uniformity of light could be maintained, and if the gas was forced over the elevation in Broad street with sufficient pressure to discharge it at Water street through the ordinary conduit pipes, the leakage, by reason of the numerous openings, would cause great waste. It will therefore be requisite, after preparing sufficient gasometer room at the works to supply the western plane of the city and store the night's manufacture, to furnish stations at several depressed points on the eastern plane of the city, adequate to its consumption. A plan of the city has been prepared, with proposed mains and pipes laid down, as follows, viz.—In

Asheton and Water streets a main of ten inches diameter in the clear, must be laid for the supply of their respective sections of the city, and connected by a transit main of the same dimensions from Asheton street down Spruce to Dock street lot, where it is proposed to make the first gasometer station; from thence the Water street main is to be supplied. The connexions to the Asheton street main between the works and Spruce street, to be stopped during the day time while the transit of gas is effecting. From the Water street main, it is proposed to lay two six inch mains up Market and Chesnut streets to Broad, up Dock street to Third, and one main of the same size up Walnut and Arch streets. Two six inch mains the whole length of Second street, and in Third from Walnut north to Vine street. One six inch main in Fourth and Sixth streets, from Chesnut to Vine street—and in Fifth street from Chesnut to Cedar street. Two six inch mains in Broad, from Cedar to Vine street. In all other streets, two lines of four inch, and in all lanes or alleys, one line of three inch pipes.

By this arrangement of the mains and lesser pipes, it is believed that an ample flow of gas may be effected in all parts of the city, and capacity of main sufficient for its regular transmission to the several gasometer stations that may hereafter be required.

In proposing this disposition of the several pipes, it has been the view of the Committee, that although the great extension will very much diminish the income of the works as taken in relation to its cost, by increasing the investment and expending it in situations where no revenue can be expected, yet as the construction of these works will be a great public benefit, increasing the comfort and safety of the inhabitants, the light, so obtained at public expense, should be shed alike on the poor as well as the rich; they therefore have provided for the transmission of gas as speedily as means can be obtained, through every street, lane, or alley in the city.

Expense of Construction.

In estimating the expense of constructing the necessary

works for the manufactory of the gas, as well as its transmission through the various sections of the city, the committee have deemed it proper, that no reflections may be cast upon them in future times, to consider them in their fullest extent, and to include works of sufficient capacity to answer for the purpose of manufacture and distribution of all that will probably be required for a long series of years. In preparing the plans, it would be judicious to make such arrangements as will carry this object into effect, that in the event of their being completed at some future day, they may present a symmetry of appearance and uniformity of arrangement, that will do credit to the city who possesses, and the engineer who constructed them; hence it will be necessary to allot ample ground, and have a general outline prepared for their future completion. In the mean time, if the commencement be in accordance with the plan devised, a very small portion of the works may be now constructed, leaving the gradual increase to be effected as the demand for gas, and the means at hand for their extension will warrant it.

The whole plot of ground alluded to, will not be more than sufficient for the object, and should at once be appropriated. Before making this estimate, it will be necessary to determine as nearly as possible, what the extreme consumption will be. This of course must be done upon the longest night in the year, as to meet this the works must be competent.

The number of lamps now in use (public,) is less than twenty-three hundred, and are spread over nearly the whole city. They will not therefore be materially increased; the estimate will be based on twenty-five hundred burning twelve hours, and consuming three and a half feet per hour; id est:— $2500 \times 12 \times 3\frac{1}{2} = 105,000$ cubic feet for one night's consumption,

Say - - - - - 105,000

Suppose 12000 burners (private,) each burning from five till ten—five hours, consuming three and a half cubic feet per hour, or $12000 \times 5 \times 3\frac{1}{2}$ for consumption = 210,000

Total number of cubic feet, - - - 315,000

To furnish to consumers 315,000 feet of gas in one night, and compensate for waste in its transmission and condensation in pipes—sixty-six coal gas retorts, with proportionate apparatus for condensing, purifying and storing, will be required. In determining the cost of these extensive works, your committee are guided by a comparison with similar establishments, and by such information as could be gained, without making complete drawings and accurate estimates from them.

Being inclined to give the fullest latitude to every contingency, they are of the opinion that two hundred thousand dollars will cover the whole expense, including the transit main from Asheton street to the Dock street station, together with three gasometer stations, and four gasometers on the eastern plane of the city, but exclusive of conduit pipes.

The expense of laying the pipes for the transmission of gas throughout the city, can be determined with considerable accuracy from the experience already had. From the plan laid down, the measurement of the several sizes has been made with due allowance for branches and hubbs, as follows:—The prices are per foot, and including every expense:

11,146 feet of 10 inch main at \$1 95	\$ 21,734 70
83,703 “ 6 “ 1 07	89,562 21
349,620 “ 4 “ 0 71	248,230 20
108,396 “ 3 “ 0 60	65,037 60
Total,	\$424,564 71
Add cost of works as above,	200,000 00
2,500 lamp posts, including lamps and fixtures, at \$25,	62,500 00
Total expense,	\$687,064 71

In preparing this estimate, the committee have been careful to avoid deceiving themselves or the Councils as to the eventual cost of the works, being unwilling to be reflected upon hereafter, for having induced the Councils, by imaginary calculations, to engage in any work more costly than they were led to believe; they have therefore placed the estimate on so

liberal a footing, that they feel confident the whole work may be executed considerably within that amount.

Several years must elapse before the whole plan can possibly be carried into execution, and it will rest with future Councils to determine whether it shall stop, or to what extent it shall be carried. In the mean time, with the expenditure of less than half of the capital stated, the works may be completed so far as may be required to convey the gas through the business parts of the city. That portion of the city will yield all the profit that can ever be expected to arise from the sale of the gas, and will of itself be sufficient gradually to extend the pipes to such parts of the city as will remain, and in which the gas will only be required for public purposes. An expenditure, it is believed, of two hundred and fifty thousand, or to the extent, three hundred thousand dollars, will carry this plan into complete effect, provided the works are not charged with the interest thereon. If the idea suggested by a committee appointed by the last Councils be carried into effect, namely, the construction of these works out of the income of the Girard estate, the Councils may rest assured, that the annual appropriation for light will be for ever extinguished, and one object of the benevolent testator carried into full effect—that of decreasing the burthen of taxation. The committee are unanimously of the opinion, that the Councils have full authority, in Mr. Girard's Will, to appropriate the surplus income of the estate for this purpose, and in this opinion they are supported by the city solicitor.

In accordance with these views, the committee have prepared an ordinance, the adoption of which they recommend. As the summer is the period of active operation, so the winter is the time for preparation, and as it would be advisable to have the works in readiness, and sufficient pipe laid to render them available for purposes of revenue before the ensuing winter, the necessity of an early decision is suggested. In preparing the ordinance, provision is made for a standing committee on lighting and watching. The object of uniting these two branches of public service, under the superintendence of one committee, is the intimate connexion which exists between the manufacture and consumption of the gas. Inconvenience has been

found to exist in other cities from the public lamps not being under the control of the gas company's agent, an evil which it may be well to avoid.

All which is respectfully submitted.

JOSHUA LIPPINCOTT,

S. V. MERRICK,

MANUEL EYRE,

R. M. HUSTON,

JOHN GILDER,

JOHN P. WETHERILL,

Committee.

Philadelphia, 1st January, 1833.

QUESTIONS

PROPOSED BY THE GAS COMMITTEE.

I. Whether it be competent for Councils to apply the surplus revenue of the Girard Fund to the purpose of lighting the City with Gas?

II. Whether it be necessary, first, to organize the police agreeably to the directions in the Will: or, if both can be done simultaneously?

The 24th Section of the Will of Mr. Girard declares one of the objects of his bequest to be "to enable the corporation to improve the city property and the general appearance of the city itself." Under this section, I am of opinion that Councils are empowered to apply the surplus revenue of the Girard fund to the illumination of the city as proposed.

In the same section a direction is given as to the organization of the police; and the further improvement and maintenance of the College is enjoined. To the completion and organization of the "Girard College," the testator postpones all other objects, and to the organization and completion of the Girard College and the organization of the police, postpones the "improvement of the city property," &c.

If Councils be of opinion that the revenues of the Girard Estates are adequate to the "organization and maintaining the College," as directed by the testator, the "organization of the police," and the "improvement of the city property," then, all these objects may be commenced simultaneously. But if it should not appear satisfactorily to Councils that the income from them is adequate to the full and entire completion of all these objects, then the objects of the testator must follow the course prescribed by the Will, viz. first, the completion and maintenance of the Girard College; second, the organization of the police; and lastly, the improvement of the city property, &c.

EDWARD OLMSTED.

Philadelphia, 3d January, 1833.

AN ORDINANCE

TO PROVIDE FOR LIGHTING THE CITY WITH GAS.

SECTION 1. *Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled,* That immediately after the passage of this Ordinance, and annually at the usual time of appointing Standing Committees, there shall be appointed a Joint Committee, of four members from the Select, and four members from the Common Council, who shall be denominated "the Committee on Lighting and Watching."

SECTION 2. *And be it further ordained and enacted by the authority aforesaid,* That it shall be the duty of the Committee so appointed, to construct and erect suitable works within

for the manufacture and distribution of carburetted hydrogen gas, for the purpose of illumination, through each street, lane, and alley in the city. *Provided,* That the pipes of conduit shall be first laid in such streets, lanes, and alleys, as the Councils may hereafter direct.

SEC. 3. *And be it further ordained and enacted by the authority aforesaid,* That the lot of ground bounded by Chestnut street on the south, Front and Beach streets on the east and west, and by property owned by the Permanent Bridge Company on the north—and so much of the lot bounded by Spruce, Dock, and Delaware Front streets, as may be necessary to contain two gasometers, be and are hereby appropriated for the location of the said gas works and gasometer station.

SEC. 4. *And be it further ordained and enacted by the authority aforesaid,* That the committee aforesaid be and are hereby vested with powers necessary for the construction of the works herein provided for—purchasing materials, making contracts, and for the purpose of carrying these purposes into effect, to employ such agent or agents as they may deem necessary.

Provided always, That the contracts of such committee shall not exceed the amount of moneys which may from time to time be appropriated for the use of said works, and they are hereby required to make report from time to time of their proceedings.

SEC. 5. *And be it further ordained and enacted by the authority aforesaid,* That the sum of three hundred thousand dollars be, and is hereby appropriated to carry this ordinance into effect, to be paid out of the surplus revenue of the Girard estate.

Provided, That the said money shall be expended in such sums, and at such times as Councils may direct.

SEC. 6. *And be it further ordained and enacted by the authority aforesaid,* That the sum of _____ be, and is hereby appropriated for the commencement of said works, and that the Mayor of the city be, and is hereby authorized to draw his warrant on the treasurer of the Girard Fund, for such sums, and at such times, as may be required by the committee aforesaid for the fulfilment of this ordinance.

Resolved, That the Committee on Lighting and Watching be, and they are hereby directed, to prepare and report a plan for the reorganization of the City Watch, agreeably to the recommendation contained in the twenty-fourth section of Stephen Girard's Will.

REPORT.

To the Select and Common Councils of the City of Philadelphia.

The committee on lighting the city with gas, to whom was referred the remonstrance of sundry citizens against its introduction, accompanied by an offer from Thomas W. Morgan to supply the city with oil.

REPORT—

That they have duly weighed the matter contained in those communications, and made such inquiries as the nature and importance of the various subjects referred to, especially the remonstrance, seemed to require.

The remonstrance sets forth sundry reasons, which, in the opinion of the signers, should be considered by Councils as sufficient ground for rejecting an ordinance, reported by this committee, for the construction of gas works.

In connexion with this remonstrance, the signers have presented a document, purporting to be an account of numerous accidents and disasters, attributed to this mode of lighting; and as the incidents referred to in this "chapter of accidents" are manifestly the foundation of all the objections urged by the remonstrants, the committee have felt themselves bound to bestow upon them an attention which they could not otherwise have claimed. In proceeding to explain the circumstances to which these documents refer, the committee feel bound to protest, at the outset, against all those statements in support of which no other evidence is produced by the remonstrants, than the irresponsible accounts contained in newspapers, the mere perusal of which, must strike any candid and reflecting man, as either

gross exaggerations, or fabricated like much other coin circulated through the same channel. Nevertheless, that they might not appear to undervalue statements which a number of their respectable fellow citizens have deemed important, an inquiry was instituted, concerning all within the reach of direct and unequivocal testimony. This inquiry has elicited facts and statements, which, coming as they do from the most authentic sources, are entitled to our highest confidence, and are therefore appended to this report.

It will not be denied, that public streets may be lighted with gas, in a manner much superior to that by any other means; and it is presumed that the citizens who have remonstrated against its introduction, would freely withdraw their objections if convinced that they are without foundation, or that the great improvements which have been made of late years in the manufacture of gas, have completely, or, in the main, overcome the dangers or inconvenience which they fear.

The two first objections urged in the remonstrance, are so nearly allied, that they may be treated under the same head, and are of so serious a character as to demand careful consideration.

They are,—“*The account of explosions, loss of life, and destruction of property, where this mode of lighting has been adopted.*”

Secondly.—“*They consider gas as ignitable as gunpowder, and nearly as fatal in its effects.*”

The evidence appended to this report directly contradicts the first of these objections, and shows how little reliance is to be placed on the document presented by the remonstrants.

Your committee will meet the second objection with two distinct propositions.

First.—*That carburetted hydrogen gas is not, of itself, explosive.*

Secondly.—*That this gas is not, of itself, ignitable.*

A lighted candle put into a gasometer will be instantly extinguished—for flame can in no case be sustained unless supplied with oxygen. It is clear, therefore, that no explosion can take place, nor can any light be emitted, until the gas is mixed with atmospheric air, from which it imbibes its oxygen.

So long as gas is preserved by itself in close receivers, no accident can occur—and further, the mixture cannot be ignited, except by the application of flame—a spark or coal will fall into it without effect.

The assertion made in the last item of the list of disasters, viz. “*that a committee of the Royal Society have ascertained, that a reservoir of 14,000 cubic feet of gas, would be equal to ten barrels of gunpowder, and never less than five*,” is incorrect. They intended to say 14,000 feet of explosive mixture. Otherwise, the proposition is absurd. Their opinion is founded upon calculation, as set forth in the extract alluded to, which reads as follows.

“As to the effect of an explosion, if it should take place, the *best calculation* that has been made from data, *not very exactly determined*, is, that in a reservoir containing 14,000 cubic feet, it would not, *under circumstances the most favourable to the explosive force*, be equal to the effect of ten barrels of gunpowder; and on an average of all circumstances, would seldom exceed that of five.”

¶ If any opinion can be formed from the effects that have been produced, it would appear that even the last estimate is over-rated.

The fact is, that atmospheric air, combined with carburetted hydrogen gas, in certain proportions, creates an explosive mixture. This mixture becomes explosive in a slight degree, when the proportions are, four parts atmospheric air and one part gas. The expansive force of the mixture increases, with increased proportions of atmospheric air, till it attains its maximum force, which results from nine parts atmospheric air and one part gas; after which, the force decreases, losing its explosive property, after fourteen parts of air are introduced.

The comparison between the explosive force of the mixture and gunpowder, is merely theoretic, and cannot, from the nature of the two substances, ever be brought within the limits of experimental comparison. The explosive power of gunpowder, when ignited, is caused by the sudden rarefaction of the air, or elastic fluid evolved during its combustion, while its visible effects are proportionate to the resistance it meets with in expanding. Explode for instance the five barrels of

gunpowder closely confined under a ledge of rocks, and the effects would be terrific; while if the same quantity were distributed in a light gasometer and open building, over a space of 14,000 cubic feet, the results would be comparatively trifling, because the resistance would be less, and the time consumed in the passage of the heat increased. The same cause operates to diminish the effect produced by the sudden expansion of the explosive mixture, and accounts in part for the circumstance that the results of the explosion of gasometers, have been in all cases *far less* than theory would attribute to them.

Having shown that an explosive mixture may be formed by the combination of gas with atmospheric air, it remains to be determined how they are ever to be united. Gunpowder is a dangerous substance in careless hands, but the nitre, sulphur, and charcoal, are very innocent until compounded in due proportions. So gas and atmospheric air are harmless when separate, and to keep them so is neither unusual nor difficult.

There are but two points, at which there can be any possibility of their coming in contact at any time.

First,—*At the gasometer.*

Secondly,—*At the service pipes within buildings.*

The gasometer, or gas holder, is a cylinder of sheet iron, having one end covered, which is inverted in a tank of water, and suspended by a chain over a pulley, counterbalanced.

The lower, or open end of the gasometer, is kept immersed in water, and the gas is introduced by a pipe passing through and above the surface of the fluid. This vessel is made perfectly air tight, the joints being well riveted together, and covered with several thick coats of paint. When this gasometer is once filled with gas, it is clear that there can be no possibility of communication between the air and the gas contained within.

The explosion at Manchester in 1819, the most serious on record, took place in the act of first filling with gas, which is the only time at which such an event is possible. From the construction of these vessels, they cannot be allowed to sink entirely to the bottom of the tank, so as ever to become entirely filled with water.

There is, therefore, when first filled, a stratum of atmospheric air, of a depth necessary to fill the space between the top of the water and gas holder. In this state the gas is let in, and mingles with the air. When the mixture has attained the proportion of one part gas to nine of air, it will if ignited produce a maximum explosive effect; but in a few minutes the accession of gas destroys the explosive property.

At Manchester there was in the gasometer 171 feet of gas and 855 feet of air, making 1026 feet of mixture. In this state, a drunken man opened the valve, and applied a lighted candle. There were two other gasometers in the same building, one within ten feet of that which was burst, and yet no other accident happened; the town was lighted, and the gas from the other gasometers flowed freely as usual.

Such accidents have been rare, even in the early stages of the art, when the properties of the gas, and the precautions requisite, were scarcely known; but for several years past, no accident of the kind has occurred, which indeed is remarkable, when we consider the immense extent to which this system of lighting has been carried. There is scarcely a town or village of any extent in England which does not participate in its advantages, and from the great cities, the turnpike roads for many miles are brilliantly illuminated.

The fire which took place at the Boston gas works last year, presents a remarkable commentary on the supposed danger from the explosion of gas holders. From some carelessness in the workmen, the roof caught fire, and was burnt. Two gasometers were in the building, in operation, supplying the city with gas, and notwithstanding they were for a long time enveloped in flame, no accident happened, and no interruption to the lights was occasioned.

The second point of danger is at the service pipe within buildings.

It has already been shown that no explosion can take place, without an admixture of gas and atmospheric air in given proportions. It is therefore clear that no explosive mixture can be made, except in confined spaces, such as closets, vaults, &c.

If therefore no pipes are carried through confined spaces, no accident can occur. It will be the object of a judicious engi-

neer to avoid all places where such a combination can be formed. In an open room, such an event is impossible, because the gas being lighter than air, will ascend and escape. But it is a fortunate circumstance, that the gas carries with it a sure premonition against such accidents, for while in the combustion it is free from any disagreeable smell, if any odour is perceived, it is a sure indication that the pipes leak, and an immediate examination must be made.

From the commencement of the art, the objection now under consideration has been most relied on by its antagonists, and has received the most serious attention.

In 1823, the matter claimed the attention of the British Parliament, and was thoroughly investigated by a committee, who, in the course of an examination which lasted several weeks, elicited the best information the kingdom could produce.

The result of this inquiry will be found in the following abstract of their report.

ABSTRACT.

“Your committee are of opinion that the danger likely to arise from gasometers and gas works is not so great as has been supposed, and that, therefore, the necessity of interference by legislative enactments, pointed out in the reports referred to them, does not press at the present period of the session.

“It appears that great improvements have taken place in the apparatus, machinery, and management of gas works, since 1814, the date of the report from the Committee of the Royal Society, which have very much lessened the danger from such works; and that improvements are daily making in every part of them, that must still further lessen the danger necessarily attendant on such establishments.

“The evidence sufficiently supports the opinion, that the risk of accident or danger is but small, if the ordinary care and attention necessary in every large establishment, is paid by the officers and workmen employed on the premises.

“It is in evidence, that carburetted hydrogen gas, usually supplied to the public, is not of itself explosive, but that, in order to render it so, a mixture of from five to twelve parts of atmospheric air, and the application of flame, is necessary;

whilst the manner in which the gasometer houses are generally built, renders it extremely difficult to form the mixture requisite for explosion, and consequently, renders the chance of accident remote.

“The danger attendant on the use of gas in the streets and passages, appears also to be small, and that it will, probably, by the better management and care of the persons employed in these establishments, be henceforth lessened.

“Your Committee cannot close their report without expressing their satisfaction that the public have obtained so great and so rapidly increasing a means of adding to the convenience and comfort of society, as the use of gas, under due management, must afford; and they are of opinion, that, as a means of police, much benefit would be derived from its general introduction to light the streets of this metropolis.”

Ten years have elapsed since this report was made, and no action has since been found necessary for similar reasons. It has for ever set at rest, in that country, the ill-grounded apprehension of the weak and ignorant, and suspended the opposition of the interested antagonist. From that moment the system has had its uncontrolled sway. Public attention was excited, and the rapidity of its course has been unrivaled by any other art or invention.

As the remonstrance under consideration referred especially to numerous accidents which had occurred in this country, your committee conceived it their duty to lay before councils the best information they could obtain on the subject. They therefore addressed a letter to the Hon. Charles Wells, Mayor of Boston, Hon. Gideon Lee, Mayor of New York, and Hon. Jesse Hunt, Mayor of Baltimore, of which a copy follows.

The replies of these gentlemen, together with a letter from the Hon. Jacob Small, formerly Mayor of Baltimore, addressed to J. K. Kane, Esq., Chairman of the Gas Committee in 1826, in reply to similar inquiries, will be appended to this report.

SIR—

The Councils of the city of Philadelphia have appointed a committee to inquire whether it is expedient to adopt a system

of gas lighting in preference to oil, on which subject they have reported.

Doubts have been expressed by a number of respectable citizens of the propriety of the measure, on several grounds. Among the most prominent are, the danger from fire to which houses are liable that are lighted in this way, and the great loss of life and destruction of property from explosions, where this mode of lighting has been adopted. With a view to elicit, from the highest source of information, facts from which the Councils may arrive at correct conclusions, the committee have directed me to address you this letter, and respectfully request that you will at your earliest convenience reply to the following inquiries.

Has there been any increase in the number of fires in your city since the introduction of gas, and if so, do you attribute that increase to the gas?

Has there been any instance in which houses are known to have caught fire from gas, and if there has, on what evidence does the statement of the fact rest?

Do you consider the introduction of gas into buildings as more dangerous than the use of lamps or candles?

Has there been any instance within your knowledge, of great loss of property, loss of life, or serious personal injury, by the explosion of gas in the works or pipes?

With much respect,

S. V. MERRICK,

on behalf of the Committee.

Philad., 18th January, 1833.

The third objection urged is in the following terms: *They believe the vast number of fires in New York and other cities, may in a great measure be ascribed to this mode of lighting; the leakage of pipes and carelessness of stopping off the gas, furnish almost daily instances of its fatal effects.*

This objection has not the smallest shadow of foundation. An appeal to common sense may convince us that a fixed light cannot be so dangerous as a portable one. To extinguish a gas light, it must be stopped off; and if the pipe leaks, the smell of the gas will detect it.

In addition to the evidence contained in the letters appended, your committee addressed a letter to Mr. W. W. Fox, President of the New York Gas Company, as follows.

DEAR SIR,

A document has been presented to Councils purporting to give accounts of numerous accidents arising from the introduction of gas. Several of these accidents are said to have happened in New York, and must of course have come under your notice. You will add another to the many obligations the committee are under, if you will state at your earliest convenience, whether the facts therein stated are true, or on which we are to place confidence. I send you a paper, containing the statement, by this mail.

Very respectfully,

S. V. MERRICK.

Philadelphia, January 18, 1833.

N. B. I should also be obliged to you to procure from a Fire Insurance Company, a note stating whether there is any difference in risk, or preference between buildings lighted with gas or by oil.

To this letter, Mr. Fox has replied as follows,

New York, 1 Month 22, 1833.

S. V. MERRICK,

RESPECTED FRIEND.

Thy favour of the 18th was yesterday received, with the newspaper referred to. Having resigned the Presidency of the New York Gas Light Company, and John J. Palmer being elected my successor, I have handed it to him, who will officially answer the unfounded representations; as no accident has occurred that can be charged upon the Company. Annexed thee has the opinion of seven Presidents of different Fire Insurance Companies in this city, as to the risks of buildings lighted by gas. All could have been obtained if thought necessary.

I am, respectfully,

(Signed)

WILLIAM W. FOX.

Franklin Fire Insurance Office,
New York, 21 January, 1833. }

MR. WM. W. FOX,

DEAR SIR,

In reply to your inquiry, whether the introduction of gas lights into buildings is deemed by this Company to have increased the hazard from fire, I have the pleasure to state, that upon its first use in this city, the fire companies generally came to the conclusion, that their risks were not enhanced thereby, and premiums were of course not varied. Indeed, it is obvious that the fixed position of the gas lights renders them less liable to communicate to any combustible material than portable lights of either candles or oil lamps.

Very respectfully,

J. WORTHINGTON,

President of the Franklin Fire Insurance Co.

(Signed)

JONATHAN LAURENCE, President Merchants' Fire Insurance Company.

A. L. UNDERHILL, President Fulton Fire Insurance Company.

E. LORD, President Manhattan Insurance Company.

JOHN LEONARD, President Firemen's Insurance Company.

THOMAS R. MERCEIN, President Equitable Company.

CHARLES TOWN, President Etna Insurance Company.

The fourth objection urged is to the "uncertainty of the light, sometimes suddenly disappearing, and leaving streets and houses in darkness."

The occurrence of such a disaster the committee have witnessed. While they cannot admit that a temporary inconvenience, and one so easily remedied, is an argument against a great and positive convenience, they have taken occasion to examine into the cause, in order entirely to obviate the difficulty in works to be erected; and being satisfied that no evil could result from this cause, they deemed it unnecessary to advert to it.

The constancy and perfection of gas lights depend upon the uniformity of velocity with which the gas issues from the

burner. Consequently, any change of the pressure under which it flows, must cause a corresponding alteration in the size and brilliancy of the flame. Hence the necessity of keeping the pressure uniform, and so regulating it as to correspond with the quantity of gas in consumption.

In the early stages of the art, it was found difficult to effect this object; but in consequence of the improvements which have been made in the machinery, this difficulty has vanished; and the lights, in well constructed works, are kept up with perfect uniformity. In the preservation of a uniform light, much depends upon the location of the works, and character of the ground over which the conduit pipes pass. The gas, being of less specific gravity than atmospheric air, will ascend rising ground with sufficient velocity, under very slight pressure; while much pressure will be required to compel it to descend; consequently, the velocity with which it issues from the burners, will vary at different points, on the same line of pipe, if there exist any considerable undulation in the ground.

It is necessary, therefore, in locating the regulating gasometer stations, to seek the most depressed points in the city to be lighted.

It was for this cause that your committee selected the Dock street lot as the first gasometer station, and advised that the great feeding main should be laid in Water street.

By a reference to their former report, it will be seen that the larger street pipes are so arranged as to reach other depressed points in the eastern plane of the city, designed for future gasometer stations; and the pipes designed for Dock street and Third street, are larger than the wants of those streets require, in order to make the transmission of gas more easy among the several regulating stations. In this city, especially, a regularity of light may be preserved with great facility; the slope of the streets being so uniform as to present no obstacle to the accomplishment of this desirable object.

The total disappearance of light is caused by a momentary suspension of pressure, and can only occur in those works where the gasometers are allowed to depend on their gravity alone, to keep them perpendicular in the tanks. In such cases, if by any accident the gasometer rest on an obstruction

in the tank, the pressure on the gas will be relieved, until the gasometer is freed; a suspension of flow is the consequence. This accident is liable to happen if the sides of the tank are not exactly perpendicular. The difficulty, however, has been entirely overcome, in later constructed works, where the gasometers are supplied with friction wheels, round the lower edge, which keep them freely suspended.

The fifth objection is, "*that the waters of the Delaware and Schuylkill must soon experience the deterioration which has reduced the water of the Thames to its present impure and unhealthy state, for no reservoirs will be able to contain the immense fetid drains from such an establishment, to the destruction of the immense shoals of shad, herring, and other fish with which they abound.*"

In confirmation of this objection, the evidence of fishermen and others, who attribute the destruction of fish in the Thames chiefly to the discharge from the gas works, is adduced.

These charges were made at the time by the persons alluded to; and in consequence thereof, and certain legal proceedings, the practice of casting the residual matters into the river, was thenceforth discontinued. The gas companies were in the habit of discharging the fetid lime water used in purification, into the sewers, which flowed into the Thames: for this offence the Dorset street company was indicted, and the nuisance abated. From that time, certain of the companies evaporated their lime water under the retorts, for use; others merely drained off the water and sold the lime for manure.

If the remonstrants had made inquiry at Baltimore, they would have found a gas factory located in the middle of the city, all complaints respecting which had ceased as long ago as 1826, as will be perceived by Mr. Small's letter appended. Now all the refuse of this factory had, until November last, to pass some hundred feet over the pavement before it arrived at the entrance of the sewer: and it can hardly be supposed that the inhabitants of that city would have endured the passage of "*immense fetid drains*" along their streets, without complaint, for a long series of years.

The fact is, that nothing passes from well conducted coal gas works but water; all the residual matters being marketable, and forming a vast source of revenue. This water, having been used to hold in solution the lime used in purification, is more or less tainted, and of disagreeable odour. The committee therefore recommended in their former report, that a pipe be laid under ground, to convey this tainted water under the tide; well knowing that no evil could result to the shad, especially in a river which they have long ceased to frequent.

If there are any fears on this head, a sink dug to the gravel will absorb every thing that flows from the works.

The sixth and final objection is in these words: “ *The constant digging of the streets, and the circumstance of the gas pipes, which, at the intersection of each square, must come in contact with the water pipes, are difficulties and evils which they would most anxiously avoid.* ”

The latter part of this objection has no foundation, as the pipes never can come in contact any where. The first part is an inconvenience, but not so great as the remonstrants would have us believe.

They have in their perception the great annoyance experienced when the water pipes were laid down, and if the same scene was to be acted over again, the objection would be worth consideration; but the cases are far different. It will be recollected, that in laying down the water pipes, the superintendent was obliged to dig the trench in the middle of the street, to an average depth of six feet, the earth therefrom occupying the entire space between the trench and curb stone on one side, while the other side was encumbered with pipes, tools, and the operations of the workmen, thus rendering the street almost impassable. In addition to this, the operation was generally delayed by the necessity of removing the old wooden logs, the street remaining for a long time unpaved, to give time for the proper consolidation of the disturbed earth.

On the other hand, gas pipes are of smaller dimensions, and are to be laid but half the depth—two lines in a street, either close to the curb or under the foot-way. By laying one line at a time, no interruption of passage will occur, and the quan-

tity of earth removed is so small, that, as in other cities, it may be rammed and repaved without delay.

If the same plan should be pursued here that obtains in Boston and Baltimore, the inconvenience will not be felt.

There, the men are divided into separate gangs, each operating in their respective spheres, so that the trench is dug, pipes laid, earth filled in, rammed, and repaved on the same day, leaving but a few feet open to recommence the next day's operation.

In conclusion, your committee would take occasion to suggest, that the objections made by the remonstrants have in no case been sustained by competent testimony, but, on the contrary, have been confuted in the most ample and satisfactory manner, by the evidence hereto appended, which has been furnished by gentlemen of the highest authority, both as regards their acquaintance with the subjects on which they have certified, and their known respectability of character.

Having shown that the objections urged by the remonstrants are founded on error, your committee next proceed to consider the offer made by Thomas W. Morgan, to supply the city lamps with oil for five years, at eighty cents per gallon, half winter and half summer strained.

Why Mr. Morgan should have presented this offer before any advertisement for proposals had been issued, and for the extraordinary term of five years, is to be found in the phraseology of the proposal, namely, to bear upon the decision of Councils on the question now under consideration: and regarding it as offered for that purpose, it shall be considered accordingly.

The introduction of this subject brings again under discussion that part of the former report of this committee which relates to the comparative economy of coal gas and oil. Before proceeding further, your committee must apologize for the grievous offence for which so much censure has been bestowed upon them in the public prints, that of quoting oil at *one dollar per gallon*, while MR. MORGAN will *furnish it at eighty cents*.

In extenuation, they will refer Councils to the price current, in which they will find the average price of winter and sum-

mer strained, from January to June last, quoted at eighty-seven and a half cents; in September it advanced to ninety-five cents; during October and November, it was steady at one dollar; in December it advanced to one dollar two and a half cents, at which price it rested at the date of the offer, that is, summer oil ninety-five cents, winter one hundred and ten, average one hundred two and a half.

It was impossible for the committee to divine Mr. Morgan's secret intentions, or to know how far the New Bedford whalemén might deem it to be for their interest to make a sacrifice on the small quantity used for public purposes, in order to ensure to insure a monopoly of the market as to private consumers, and prevent competition; and it was not till the offer was made by him, that the magnitude of the object to be gained was perceived, or the motives of the opposition to the gas works appreciated.

The great dissimilarity between the market price of oil, and the offer, induced the committee to make a similar comparison for former years; and they find that in 1827, the contract price was sixty-one cents; the average price of the two oils at the time the contract was made, sixty-two and a half cents; difference one and a half cent.

	<i>Contract price.</i>	<i>Market price.</i>	<i>Difference.</i>
1828	65 cents.	70 cents.	5 cents.
1829	66 2 3	71½	4 86-100
1830	72	77½	5½
1831	77	85	8
1832	83	87½	4½

Thus the greatest difference between the market and contract prices, in the last six years, was eight cents per gallon; and that contract was made *shortly after Mr. Johnson's resolution in Common Council, to inquire into the expediency of constructing gas works.* The offer of Mr. Morgan to supply oil at *twenty-two and a half cents below the market price*, can only be attributed to a determination on the part of the New Bedford whalemén, for whom he sells, to prevent, if possible, the creation of any competition in the sale of oil to private customers, even at a sacrifice on that used for public purposes. And in this design we must give them credit, for

setting us an example of that long sighted policy for which our northern brethren are celebrated; an example which it might be well for us to follow.

In the former report, your committee compared the value of coal gas as relating to oil, at two hundred feet of the former to one gallon of the latter.

It appears that some misapprehension has arisen on the part of certain individuals, who suppose the committee intended to estimate the cost of manufacture of coal gas at three dollars thirty-three and a third cents per thousand feet. The committee made *no estimate* of the cost of manufacture. They contented themselves with stating that three dollars thirty-three and a third cents was the selling or market price of coal gas, and showed that the company who make it, sell at that price, and are now deriving handsome profits. Surely this is plain enough to any one not pre-determined to misunderstand. In fact, this corporation will make a handsome profit by manufacturing and vending coal gas at that price; and the committee proposed to expend the profits in giving the citizens light in the public streets.

In comparing the economy of the two modes of lighting, as respects the citizens generally, the *retail price* of oil must be taken into view. To them it must be a matter of some moment to receive their nightly supply of light without even the trouble of cleaning lamps or inserting wicks, at a cost equal to 66 2-3 cents per gallon for oil, for *that would be the retail cost of two hundred feet of gas*, instead of paying, as they are now doing, from one dollar ten, to one dollar twenty-five cents for oil.

If we were to consider these works merely as regards the expense of public lighting, the object would be small indeed. It is the duty of every legislator to advance the general interests of the people with whose government it is intrusted.

The mere saving of a few shillings in the tax bill is of minor consideration, when compared with the general comfort, convenience, and positive good, to be derived by a community, from any great public measure.

The broad question is always to be considered, whether a proposed measure will be a general benefit to the citizens

or not. The measure now proposed is the construction of gas works.

Independently of the consideration, that the profits of these works will, in the course of a few years, relieve the citizens entirely from taxes for lighting the streets, while that object will be attained in a manner far superior to the present mode; the inevitable consequence will be, by the creation of competition, that while those who use the gas will procure the same amount of light at a far cheaper rate—others who do not, will feel the effects, in the reduction of the price of oil itself.

Of the amount of this saving, your committee can form no adequate estimate; not having the necessary data to show the quantity of oil consumed during a year in the city; but that it is immense there can be no question. If, therefore, the manufacture and sale of gas, at a price which we have the most positive evidence yields a handsome profit, will produce such benefits to the citizens generally, the Councils are not justified in refusing to introduce it, while they steadily refuse any one else the privilege to do so.

Your committee are aware, that this report has been already extended to an unusual length; but the importance of the measure, and the deep interest it has excited, must be their apology for trespassing still longer on the time of Councils.

Perhaps it may not be strictly within rules to notice any matter in a report, but that directly referred to; but the bitter attacks which have been made in the public prints upon this project, and in some cases, personal attacks on this committee, make it proper for them to trace the action of former Councils in relation thereto.

They do this with less reluctance, as the able report of a former committee sheds much light on the subject, and may perhaps aid the Councils in their decision.

The first action of Councils was in the session of 1826-7, upon an offer made by Messrs. Robinson & Long, to supply the city lamps, within the range of their pipes, with as much gas as would give double the light as the oil lamps in use, at the same price as the oil lamps cost.—Provided permission was given to lay pipes in the streets. This offer was subsequently extended, so as to light the *public lamps free* of all cost.

With this application came the following recommendation:

“We the subscribers, citizens of Philadelphia, being anxious for the improvement of our city, would be glad if Councils would take into consideration the foregoing application.”

Joseph S. Lewis,	George Vaux,
Coleman Sellers,	Peter A. Brown,
John Bacon,	Edward S. Burd,
Cadwallader Evans,	Thomas P. Cope,
C. W. Peale,	R. A. Caldcleugh.

This application was referred to a committee consisting of Messrs. J. K. Kane, Joseph Donaldson, Levi Garret, and Thomas Hale, who, after carefully examining the subject, and extending their inquiries to all authentic sources within their reach,

Reported, “That they were satisfied, that the proposed plan of lighting the city, would be more effectual, cheaper, and in some respects less troublesome, than that now pursued, and that the opportunity which it would present to the citizens of employing gas to illuminate shops and large buildings throughout the city, would be found generally advantageous.”

Their report was unfavourable to the application, but suggested several inquiries. The most important was, “whether it would not be wiser and safer, more accordant with the established policy of this city, and in the end more for its pecuniary interest, to rely for the supply of gas, on the manufactories connected by an officer of the city, at its cost, and under its exclusive control.”

At this suggestion, a second committee was formed, of three members of each Council, whose report gives evidence that they investigated the subject very closely; while they postponed, for reasons assigned, any immediate action. They go on to state,

“That they are persuaded, from the information they have collected, that the lapse of a few years will make it proper to consider this question again. The experience of all the principal cities in England, and two in this country, which are now lighted with gas, is uniform, with regard to its general expediency,” and further, that,

“It appears by the evidence before the committee, that the manufacture of gas, from coal or oil, does not, in the present improved state of the process, produce noxious or offensive smells in the neighbourhood, either of the manufactory, or of the culverts by which the refuse matter is carried off, in a greater degree than other manufacturing processes which are always permitted in cities—that it does not involve peculiar danger or liability to accident—that it does not require extraordinary care or experience on the part of the workmen, while under the direction of a faithful superintendent, and that the supply of gas, from a well regulated manufactory, is not exposed to irregularity, or occasional intermission; but is certain and constant, under all circumstances.

“It further appears, by the same evidence, that the use of gas is not dangerous; that it is not more hazardous to property, or life, than other kinds of light; and is not offensive to the smell or unsteady: but that on the contrary, it is generally employed in hotels, manufactories, theatres, and other buildings, where there are facilities to procure it. That where it has been used to light the streets of cities, the effects of its superior brilliancy, have been a reduced necessity for a large night police, and a sensible diminution in the number of crimes; and the introduction of it into cities has been uniformly deemed a public benefit by their citizens.”

After noticing the offer made by Messrs. Robinson & Long, the committee go on to show,

“That a much greater saving may be made in the end, by establishing manufactories, at the expense of the city, from which the public lamps should be supplied, and the right of using the gas vended to the citizens. Indeed it is doubted whether the profits of the gas sold, would not, in the result, nearly defray the whole expense of lighting the city.”

This report is signed by Messrs. J. K. Kane, Joseph Donaldson, Charles Massey, Jr., Thomas Hale, and Samuel Wetherill, and your committee consider their opinion as entitled to great weight.

From the time this report was made, December 1826, it appears that the construction of gas works, at city expense, when the proper time should arrive, has been anticipated by

all parties; and accordingly, every application by private companies, for permission to lay pipes in the streets, has been refused. In 1827, the question was brought again before Common Council, and carried, but failed in the other chamber.

Other actions have since been had, upon private applications; but no serious effort, on the part of the citizens, was made, until the session of 1831-2, when three petitions were presented, wherein, "the petitioners call the attention of Councils to the expediency and propriety of erecting, at the expense of the corporation, suitable works for the supply of gas, for lighting the streets and private houses. They were impressed with a belief, that the corporation of Philadelphia, availing itself of the experience of other cities, may now embark in such a project with decided advantage, and with a certainty of avoiding every reasonable objection on the score of inconvenience or expense. They believe, moreover, that when gas works shall have been erected on a proper plan, the city may derive such a profit from the sale of light to private establishments, as will repay the expense of lighting our streets in a superior style; and at no very distant period, sink the capital originally expended. If these views be correct, your honourable bodies will not hesitate to adopt a measure so important to the convenience and security of many private individuals, and so well calculated, by increasing the light of our streets, to aid the operations of the general police."

These memorials were signed by

Thomas P. Cope,	William Neil,
W. Platt,	Thomas A. Wright,
James Perot,	A. Sellers, Jr.
J. K. Kane,	Samuel Ross,
Edw'd B. Garrigues,	Edwin T. Scott.
Amos Taylor,	William C. Cooper,
C. Newbold, Jr.	Armon W. Davis,
R. M. Lewis,	Thomas C. Garret,
J. Bringham,	Daniel B. Griffin,
Franklin Platt,	E. S. Simmons,
John Fritz,	John Eberle, Jr.
H. D. Gilpin,	John Davis,
Lawrence Lewis,	Edward C. Mielke,

E. L. Carey,	James Williams,
Samuel Palmer,	Richard Price,
T. S. Hollingsworth,	William J. Shields,
J. M. Sanderson,	Edward C. Biddle,
J. M. Phillips,	S. George Morton,
Francis King,	Joseph Price, Jr.
S. V. Merrick,	Samuel P. Griffith,
Charles Johnson, Jr.	J. S. Rose,
Isaac Lloyd, Jr.	James Kitchen,
J. B. Phillips,	Isaac Lea,
A. Hart,	John White,
James Large,	Alfred Cope,
J. N. Harmes,	Thomas Earp,
John Latour,	Thomas Wickersham,
Jonathan Coffee,	M. E. Israel,
James Latimer,	John Hanson,
Samuel J. Robbins,	Charles Humphreys,
Thomas Mellon,	John Rutherford, Jr.
N. Bunker,	John Watson & Co.
Charles Hidelius,	Isaac Starr,
Abraham L. Hart,	Thomas Simpson,
Caleb S. Wright,	R. Battius,
Charles Robb,	James Glentworth, Jr.
William Robb,	D. Winebrenner,
William Biddle,	Joseph Roberts,
J. Kerr & Co.,	Solomon Temple,
Henry Troth,	J. K. Williams,
Philip Garret,	W. F. Krumbhaar,
Edward Needles,	W. R. Kitchen,
J. W. Dixon,	Richard Price,
A. S. Roberts,	Edward Leuderich,
Oliver Cope,	Edward Roberts,
James M. Key,	Edward R. Evans,
A. J. Mackie,	John Biddle,
Abraham Russel,	William H. Barrington,
Wm. M. Collins,	George W. Watson,
George Peterman,	Norwood Penrose,
Caleb Cope,	Andrew Garret,
Samuel S. Penrose,	Nicholas Newlin,

Callender Price,	Oliver Fuller,
R. J. Kennedy,	Charles J. Thomas,
Samuel Spackman,	J. W. Smith.

The presentation of memorials containing so strong an expression of the wishes of the citizens, could not fail to attract that attention from Councils, which the importance of the subject demanded.

Accordingly, Messrs. Lippincott, Neff, Petit, Wetherill, Moss, and Lehman, were appointed to renew investigations upon it.

This committee appear to have made all the inquiries necessary to arrive at correct conclusions. They corresponded with individuals versed in the art, procured estimates of the cost of works and the manufacture, and satisfactory evidence as to its utility, economy, and expediency. The report of their proceedings, in favour of granting the prayer of the petitioners, was made to Select Council, on the 13th of September, 1832, accompanied by two resolutions, which were considered and passed without division, on the 4th of October.

“Resolved, By the Select and Common Councils, that it is expedient to adopt a plan for lighting the streets of the city with gas, and for supplying public and private buildings with the same.”

“Resolved, That a committee of three members be appointed to examine the city property at the corner of Chesnut and Schuylkill Front streets, and report on the measures proper to be taken in order to establish a gas factory according to the views contained in a report made by a committee of Councils, September 13, 1832.”

The close of the session being near at hand, the report and resolutions, *as adopted*, were referred to the early attention of the next Councils.

Thus, a measure which had received the sanction of all former committees, and had been postponed under proper considerations at the time, was, upon the petition of a large number of highly respectable citizens, finally considered and resolved upon by the Councils of 1832, who have left their resolutions to be carried into effect by their successors. Accordingly at the first meeting of Councils, the undersigned were

appointed to report the measures necessary to carry these resolutions into effect, who proceeded to review the labours of their predecessors.

Being aware of the great losses which have occurred in the construction of public works, from the circumstance of those having the general superintendence being compelled, for want of practical information, to depend solely on the agents employed, your committee determined that no censure should attach to them on that ground. They therefore asked and obtained leave to visit all the works in this country, for the purpose of making themselves acquainted with the art in its practical details. The result of the inquiry was a further confirmation of the opinions heretofore detailed by other committees, as to the general expediency of the measure.

The report of this committee, while it embraced as much general information as was deemed necessary, was not intended as an argument upon the expediency of the measure; as it was believed the adoption of the system of lighting had been determined on. Their estimate of expense appears to have been as much misunderstood as other items. The desire of the committee was to inform Councils of the whole eventual cost; while, by the ordinance, they limited the amount of capital to be invested at \$300,000, and showed that the profits of the works would, after that expenditure had been made, be sufficient to supply the remainder, and extend the pipes as fast as prudence would dictate.

Upon a review of all circumstances, your committee are of opinion, that a proper understanding of all facts in relation to gas lighting, as they really exist, is all that is now required to banish from the minds of their fellow citizens, who now oppose it, all hostile feelings, and render the adoption of the plan as popular as that pride of our city, the Water Works. Those who recollect the excitement which existed when those works were projected, and which are now so deservedly popular, can feel no surprise at any expression of hostility to a project, which our citizens have been assiduously taught to believe is fraught with every species of evil, without a redeeming quality, and with the merits of which they are to this day unacquainted.

The best evidence of good to result is to be obtained by experience; and as we have the means of bringing this plan to the test of experiment at a moderate expense, and without risk of loss, your committee would recommend that Councils should limit their views, in the first instance, to the lighting a part of such streets as are occupied by stores and public buildings—say, parts of Market, Chesnut, Second, Third, and Fourth streets. To this end, the works should be commenced, as suggested, on Schuylkill; but one gasometer placed on Dock street lot; and the connecting main, with five or six miles of pipe laid; the expense of which will be covered with about \$90,000. By limiting the pipes to the centre of the business population, a very large revenue in proportion to the expenditure will accrue, and our fellow citizens will have ample opportunity of forming a correct opinion in relation to the expediency of prosecuting the work to completion.

All which is respectfully submitted, by

JOSHUA LIPPINCOTT,
MANUEL EYRE,
JOHN P. WETHERILL,
JOHN GILDER,
R. M. HUSTON,
S. V. MERRICK,

Committee.

Philadelphia, February 14, 1833.

LETTER FROM THE HON. GIDEON LEE, MAYOR OF NEW YORK, TO S. V. MERRICK.

MAYOR'S OFFICE,
NEW YORK, FEB. 13, 1833.

SIR,

The letter you addressed to me on the 17th January last, was placed in the hands of the committee on Lamps and Gas of this corporation, to prepare the answers to your inquiries on the subject of gas lighting in New York—that letter had been mislaid among the multiplicity of documents in their charge, but I am now enabled to reply thereto:

To the first of your queries,

Has there been any increase in the number of fires in your city since the introduction of gas lights—and if so, do you attribute that increase to gas?

I answer—I am not aware that there has been any increase in the number of fires since the introduction of gas lights; nor can any of the fires that have taken place be jointly attributed to their use.

2d. Has there been any instance in which houses are known to have caught fire from gas: and if there has, on what evidence does the assumption of the fact rest?

All the accidents occurring from fire and attributed to gas lights, as far as I have ascertained, would have happened equally from the use of lamps or candles. Indeed, the newspapers have charged one accident to the use of gas, where none was within the building: and others, where the gas was *found stopped* after the fire had been extinguished.

3d. Do you consider the introduction of gas into buildings as more dangerous than the use of lamps or candles?

I do not. Our Insurance Companies, who are the most competent judges in this matter, charge no additional rate of premium on buildings lighted with gas, considering them *at least as safe*; as a proof of this, the following are so lighted—All our Theatres within the gas limits—nine of the Churches and Session Rooms—the Custom House and Post Office—the principal Hotels, &c., viz: City Hotel—Washington Hotel—Clinton Hall—Masonic Hall—Tammany Hall—Webb's Congress Hall—Niblo's Congress Hall—Adelphi Hotel—North American Hotel—Pearl street House—Franklin House—Military Hall, &c. &c.—Reading Rooms—Ball Rooms—Libraries—Bankers' Offices—Printing Offices—Museums, &c. &c.

4th. Has there been any instance within your knowledge of great loss of property, loss of life, or serious injury by the explosion of gas, in the works or pipes?

There has been no instance in this city during the existence of the gas company (eight years) of any considerable loss of property by the explosion of gas. The Gas Company state that one hundred dollars would repay all the property ever injured by such cause—no serious injury has ever been sustained

by any person—nor has any explosion ever taken place at their works, or about their pipes—no loss of life has occurred in any way connected with their operations.

Any other information within my reach, which you may wish to obtain, will be communicated with pleasure.

I am, sir, respectfully yours,

GIDEON LEE, *Mayor.*

Committee of Councils on
Gas Lighting, Philadelphia.

LETTER FROM THE HON. CHARLES WELLS, MAYOR OF
BOSTON, TO. S. V. MERRICK.

CITY OF BOSTON, JANUARY 22, 1833.

SIR,

Your letter of the 18th instant was duly received. In answer to your inquiries allow me to say, that the last fall, the gas works in this city took fire and burnt the roof entirely off: great fears were entertained at the time of the fire for the safety of the neighbourhood, as the impression prevailed very generally that an explosion would take place, but to the great surprise of all, no accident occurred. Soon after the fire, the subject was brought before the City Council and referred to a committee, who after a full investigation of the whole subject, made a report, that was quite satisfactory to the government, and I believe to the citizens generally. A synopsis of this report was published in some of our newspapers, a copy of which is enclosed. You will pardon me for sending you a reply to your inquiries in this shape, but presuming that it contains in some degree the information you are in pursuit of, and quite as much as is in my power to communicate in any other manner, is my apology for adopting this course. I may further state, that the Insurance Companies in this city, have not raised their rates of insurance in consequence of the introduction of gas lights into some of our houses and stores.

This fact I think will convince you that the risk of fire is not increased by this mode of lighting buildings, in their opin-

ion. If any other information in my power to give relative to the subject, will be of service to you, it shall be communicated.

With great respect,

CHARLES WELLS, *Mayor*.

To S. V. MERRICK, Esq.

GAS WORKS.

This subject, which has occupied so much of the time and attention of the committee of the aldermen, in the investigation of the complaints against the Gas Works, is now set at rest, we trust, by the result of that inquiry.

The grounds of complaint against the Gas Works were four. 1st. Injury to health : 2d. Danger of explosion : 3d. Annoyance by the smell, smoke, and soot : 4th. Depreciation of real estate. The first two points were conclusively settled by the opinion of the consulting physicians, (Doctors Warren, Shattuck, Shurtleff, Randall, and Hayward,) whose advice was taken by the committee, and who unanimously declared "that no facts have come to their knowledge in this or any other city, which warrant the belief that these Works are dangerous to health ; so far as regards epidemics produced by atmospheric influence, they presume that the decomposition going on in these Works would have a tendency to correct or destroy atmospheric miasmata, which produce epidemic diseases." This opinion is corroborated by the fact stated in the French journals, that in Paris, where the cholera raged with greater violence than in any other city in Europe, the neighbourhood of the Gas Works was comparatively free from its influence and ravages. The uncommon good health enjoyed by all the persons employed in the Works in this city, including the proprietor who is there daily, from six to ten hours, also demonstrates the groundlessness of this complaint.

The danger of explosion was shown to be equally imaginary. The gas is contained in a tub or vat called a gasometer, con-

structed of thick plank, surrounded with numerous iron hoops of great strength ; the bottom of this vessel is filled with water to the depth of nineteen feet, and in it is suspended a bell of plate-iron, riveted and made air-tight. The gas is introduced into the bell through the water, and has no communication whatever with the external air, except by the supply pipes ; when the bell is filled for the *first* time, there is a mixture of gas and atmospheric air in the gasometer, which is *explosive*, but this is only for *a few minutes*, and can never occur again, for the atmospheric air is forced out through the supply-pipes, by the gas, and is consumed in the burners.

The physicians on this subject, say—"The carburetted hydrogen gas which is used for lighting cities *cannot burn, much less explode*, except it be mixed with oxygen gas ; that a mixture, sufficient to produce an extensive inflammation and explosion should suddenly occur, is highly improbable. If such an explosion of the gas did take place, we presume its effects would be confined to the edifices in which it was manufactured."

This concurs with the opinions of Sir Humphrey Davy, Mr. Wollaston, and other scientific men, who were examined in 1823, before a committee of the House of Commons in England, *and all experience since has shown its soundness.*

The third specification of complaint was the annoyance to the neighbours from smoke, smell, and soot. On this point, between *thirty* and *forty* witnesses were examined before the committee. Their statements were various as to the existence and degree of annoyance from these sources. One would assert, that he and his family were often suffocated with the stench of the gas, his rain-water spoiled by the soot, and his clothing, hung out to dry, stained and spotted with the particles of black from the chimney of the gas works ; while his next door or opposite neighbours declared that they and their families had experienced none of these annoyances, or had perceived only some of them in a very slight degree ; this too was by persons equally the proprietors of the estates they occupied, and equally interested in getting rid of the gas works, if they were really a nuisance. Nothing, therefore,

like “a common nuisance” could be made out from such contradictory testimony.

The last ground of complaint was the depreciation of real estate since the erection of the gas works in 1828. This was much urged on the consideration of the committee; and it was stated by different witnesses variously,—some fixing the reduction in value as high as thirty-five per cent., and others descending gradually to ten per cent. It was shown, however, by Mr. Robinson, that in Ward No. 1, to which all the grievances complained of are confined, there had been a steady increase in the valuation of the real estate in the last ten years, with the exception of the disastrous year 1830, (that “year of famine” to the proprietors of factories,) when it was a little reduced. In 1823 the whole real estate in the Ward was valued at 831,400 dollars, and in 1832 at, 1,189,600 dollars. It was also shown that during the period since the erection of the gas works, purchases of lands in that quarter had been made to the amount of 287,000 dollars; and that instead of any depreciation in price, within a few months land adjoining the estate of Mr. Robinson had been purchased by gentlemen residing in the ward, at a price *higher than he gave for the gas works land*.

It was urged by the proprietor of the gas works that a *removal* of them was *impossible*, all the great ducts and arteries which were laid down under the streets, being adapted to the present location of the manufactory;—that in London and very many other cities and towns in Great Britain, and on the continent, works of this nature have been established, and generally were to be found in the heart and centre of the population;—that so long ago as 1822, there were six companies in different parts of London, who worked more than *eleven hundred* retorts, while here, only *eight* had been in operation hitherto;—that in New York, Philadelphia and Baltimore, the gas works were located in central and populous places, and had been in operation for years, *without complaint*; that upwards of *five hundred* public and private buildings in this city are now lighted with gas, the fixtures for which had cost the consumers 30,000 dollars;—that the moral effects from the use of gas in lighting the streets, and thus preventing assaults

and crimes, for which always *darkness is sought by the perpetrators*, had been largely experienced in England, and warmly acknowledged both by the Committee of Parliament, and by Sir Robert Peel when secretary of state ;—and that a prohibition to his carrying on his works in their present location, would be equivalent to their entire destruction.

The committee, (Henry Farnam, John Binney, and Jabez Ellis, Esqrs.) after much consideration, made their report, in which, after stating the complaints and the evidence on both sides, they dispose of the first two, (and by far the most serious ones if they were well founded,) by reference to the opinions of the faculty and scientific men abroad ; and in conclusion they say, that “under all the circumstances of this important case, after carefully examining the notes of witnesses and considering all the documents, they believe that those who live very near said works are occasionally annoyed and subject to inconvenience, and no doubt to some depreciation in the value of their real estate ; still, when the whole city is included, these gas works are a convenience to the inhabitants. In fact, the committee believe that the introduction of gas light into this city is a *great public benefit*, and they cannot close their report without stating further, that the cities in England have derived great comfort and convenience by the use of gas lighting; and as *a means of police* much benefit has been derived from the introduction of this light into their streets and lanes. The committee are aware that this report will give offence to some of their fellow-citizens whom they highly respect, but having honestly and unanimously arrived at the above conclusion, they cannot for a moment hesitate to declare it. The committee are of opinion that the mayor and aldermen have a supervisory power to regulate and control said gas works, and should use it whenever *public* safety and convenience require, but at the present time it does not require their interference.”

LETTER FROM THE HON. JESSE HUNT, MAYOR OF BALTIMORE, TO S. V. MERRICK.

MAYOR'S OFFICE, JANUARY 24, 1833.

DEAR SIR,

I have received your favour of the 17th instant, and have given to the subject that examination and reflection which its importance merits. I will now with pleasure answer the questions which you have propounded.

1st Question.—“Has there been any increase in the number of fires in your city since the introduction of gas light—and if so, do you attribute that increase to gas?”

Answer.—In my opinion there has not been an increase of fires in our city since the introduction of gas light.

2d Question.—“Has there been any instance in which houses are known to have caught fire from gas, and if there has, on what evidence does the assumption of the fact rest?”

Answer.—I do not know of a single instance of a house being seriously injured by fire proceeding from gas light: on inquiry, however, I am told that one case occurred in consequence of the gas light having been placed too near the ceiling; of course an oil lamp in the same situation would have produced the same effect.

3d Question.—“Do you consider the introduction of gas as more dangerous than the use of lamps or candles?”

Answer.—It is my decided opinion that gas light is less dangerous than that of lamps or candles.

4th Question.—Has there been any instance within your knowledge, of great loss of property, loss of life, or serious personal injury by the explosion of gas in works or pipes?”

Answer.—I do not know of a single instance of loss of life, or serious personal injury, in consequence of the explosion of gas works or pipes. I have known of several slight explosions in consequence of apertures in gas pipes, but in every case it is believed to have been the result of manifest inattention. The gas becomes extremely offensive before the requisite quantity to produce the explosive mixture can combine with the atmospheric air, to such an extent as to render an explosion

at all probable, and of course it can always be prevented by turning off the gas.

Very respectfully, yours, &c.,

JESSE HUNT, *Mayor of Baltimore.*

LETTER FROM JOHN YATES CEBRA, ESQ. TO JOHN MOSS, ESQ.

NEW YORK, 26th DECEMBER, 1831.

DEAR SIR—In replying to your inquiries respecting gas—I can state with confidence, and in a very few words:—

Gas is generally approved of and used in all the lower part of this city—drawing a line from Canal street to the Battery. Canal street is as high up as the present company have permission to lay pipes.

There is nothing offensive arising from the use of gas, but *like oil*, may become so, unless proper care is taken.

Private families use it, and in almost every new and fashionable house now putting up, it is introduced.

Such an establishment is desirable in all large cities—our contracts for posts and pipes have all been made with your Mr. Richards.

A new company has been formed, and received a charter last winter for the upper wards, and the pipes will be laid down the moment they close their contract with our Corporation for lighting the city lamps.

The anxiety of our citizens is extreme to have pipes laid down for gas, in place of oil.

The present price or cost of lighting a city lamp is regulated by the price of oil—now cost \$5 12-100 per lamp.

With wishing you and your family, and the president of your board, a merry Christmas and a happy New Year,

I remain yours, with respect and esteem,

JOHN YATES CEBRA.

I am not *directly* or *indirectly* interested in gas stock.

J. Y. C.

LETTER FROM HON. JACOB SMALL, MAYOR OF BALTIMORE, TO J. K. KANE, ESQ. OF PHILADELPHIA.

MAYOR'S OFFICE, BALTIMORE, DECEMBER, 13, 1826.

SIR,

Your letter addressed to me as mayor of the city of Baltimore, requesting information on certain points respecting the manufacture and use of gas in this city, for the purpose of lighting the public streets, has been duly received, and I comply with pleasure with your request.

Officially, I have no other knowledge of the subject of your inquiries, than the existence of a contract made previous to my appointment to my present office, in virtue of which all the public streets and parts of streets through which the pipes of the Gas Light Company have been extended, are lighted by that Company—the expense is no greater to the city than when the same portion of the streets was lighted with oil; the light is much superior, and the use of it much more satisfactory to the police of the city, and to the citizens. No complaint of any kind has ever been made to the police of any inconvenience or injury as resulting from the manufacture or the use of gas.

As an individual citizen of Baltimore, I have observed with some attention the progress of the manufacture of gas for lighting the public streets, and the buildings, public and private, in Baltimore. Complaints were made for some time after the commencement of the manufacture, by those who resided in the immediate neighbourhood of the factory, that the smell was offensive, and, occasionally, it was complained of by those who used it in their stores. It was represented to be particularly offensive, when from any defect in the pipes, it escaped without being consumed. All these complaints have long since ceased: so much improvement has been made in the manner of purifying the gas, that I find from inquiry, the consumers are entirely satisfied, and that no offensive smell is perceptible in the houses where it is consumed, except when there is a defect in the pipes and a portion of the gas escapes. From my own observation I can state, that the smell in the vicinity of the factory is not more offensive than in the neigh-

bourhood of tan yards, soap factories, and various other factories in the city. I have not heard of any complaint respecting the sewer or culvert by which the refuse matter is carried off from the factory, and therefore conclude that there is no cause of offence from that source.

No accident has ever occurred to my knowledge in this city from the manufacture or use of gas, nor can I learn that there has any accident or injury happened worthy of notice. The use of it in houses is not considered as increasing the risk by insurers against fire, and all who use it unite in stating it to be more cleanly, convenient, and free from trouble, than any other description of light. The supply since the last improvements in the factory is certain, sufficient, and regular, and I can with certainty state it to be the general impression of the citizens of Baltimore, that the introduction of gas light into our city is highly beneficial to the public.

The time necessarily employed in making particular inquiries on some of the points mentioned in your letter, has delayed this answer longer than it was intended. If any further information on this or any other subject is desired, which you may suppose in my power to communicate, I shall with much pleasure answer your inquiries.

I am with much respect, your obedient servant,

JACOB SMALL,
Mayor of the City of Baltimore.

LETTER FROM JOHN J. PALMER, ESQ. PRESIDENT OF THE
NEW YORK GAS LIGHT COMPANY, TO S. V. MERRICK.

NEW YORK, JANUARY 26, 1833.

SIR,

I have read the "disastrous detail" of accidents published in the Philadelphia Gazette, and said to have been occasioned by the use of gas lights. It is probable that those in other places are as much exaggerated as the instances stated to have occurred in this city. But for your information, I will now take them up in the order they have been presented, and give you the facts in each case as far as they can be obtained from

the parties interested:—where this is impracticable, from the best information to be got.

1. “An eclipse. New York—Chatham street, within and without, left in perfect darkness by an obstruction in the pipes, as well as Chatham theatre,” &c., &c.

This eclipse took place in 1825, almost immediately after the Gas Company commenced its operations. There was no stoppage in the pipes; but the supply of gas was really found to be deficient, and notice of the circumstance was given early in the evening to its consumers. This disaster therefore is frankly admitted; but I believe such a case has not occurred since.

2. “Great loss by fire.—Fifty thousand dollars lost by fire, occasioned by the gas, not being properly stopped, escaping from the pipe and igniting at the *coal grate*.”

I addressed a note to Mr. N. Smith Prentiss, the owner of the premises alluded to, and enclose his reply marked No. 2. I have also ascertained that after the fire, the gas was found to have been shut off between the store and the street main.

3. “The theatre took fire from a flaw in the gas pipe, November 1826.”

The person who directed the lighting of the theatre alluded to, explains the cause of that trifling matter in a note marked No. 3.

4. “New York.—A shop window in the arcade set on fire and destroyed by a bottle of Cologne water falling on the gas light.”

The person occupying the shop alluded to, explains this disaster by the statement No. 4. The use of gas is still continued by Mr. Hart.

5. “Store No 65½ Broadway, Mr. Harrison, a few moments after lighting his gas, the gas *receded*, burning to the metre in the cellar, and exploded with a noise equal to a twelve pounder, &c. Mr. H. much burnt.”

This Mr. Harrison, (who has left the city) had just taken possession of the premises, and attempted to use the gas lights without application to the company; the fixtures, &c., for that purpose being left in the store by a former occupant. Having turned on the gas by opening the stop-cock in his cellar, and

finding it would not ignite at his burners, in searching for the cause, he set fire to the stream of gas flowing into his cellar. He was not aware that the connexion between his premises and the main had been removed. It is not true that the gas receded, for no gas passed into the tubing—or that any such explosion took place—or that Mr. Harrison received the smallest injury—or that any thing was burnt except the cobwebs at the cellar door.

I examined the premises the following day, and received the information from Mr. H., who had the connexion restored, and lighted his store with gas.

6. “New York, May 30, store corner of Broadway and Chamber street—contents destroyed, valued at \$15,000, *supposed* from gas in the rear of front window.

This *supposition* is probably incorrect, from the statement given by Mr. Aymar the occupant, marked No. 6.

7th. “New York. Explosion of gas at the Masonic Hall, Nov. 1832—threw down chandelier and considerable portion of the ceiling on the company assembled, one severely, and many slightly injured.”

The tubing for conveying the gas to some of the lodges above, had been improperly led through a small dark closet in the third story, where a stop-cock was placed. This becoming loose, an escape of gas had been observed for some time, but was neglected. A servant approached the closet with a light to turn on the gas, and ignited that collected within the closet. He was forced back from the door, and the concussion loosened a piece of the plaster from the ceiling in the room underneath. No chandelier fell—not a person in the assembly below received the slightest injury, and the business of the meeting proceeded as usual.

These I believe are all the accidents, brought forward by the opposers of gas lights, applicable to New York. The fears and prejudices of this community are daily giving way to reason and experience: like steam-boats, rail roads, and other improvements, this mode of lighting must overcome all obstacles, and come into general use here, as it has done in Europe.

Some of the paragraphs from London papers are too ridiculous to notice.

I am, sir, yours respectfully,

JOHN J. PALMER.

No. 2.

NEW YORK, JANUARY 24, 1833.

JOHN J. PALMER, Esq.,

President New York Gas Co.

SIR,

I have never before seen the statement headed "Great Loss by Fire," contained in your note of yesterday, nor can I imagine with whom it originated.

It has always been my belief that the gas fixtures in the store in Broadway, in no way contributed to the destruction of the premises, and have uniformly so stated my conviction.

We have recently had the gas introduced into our premises, No. 45 Maiden Lane, and believe that with ordinary prudence it is more safe than either oil or candles.

Yours, respectfully,

N. SMITH PRENTISS.

No. 3.

The accident in the gallery of the Bowery Theatre, occurred while the lighting of the gas was under my direction. A trifling escape of gas under the floor of the gallery was carelessly set on fire by the man employed to light the burners, and owing to the difficulty of access to that part of the house, some time elapsed before the gas could be shut off, and the floor being filled with shavings, done some trifling injury to the gallery;—but did not interrupt the performance of the evening, or prevent the gallery from being open as usual.

STEPHEN B. DEAN.

New York, January 26th, 1833.

No. 4.

NEW YORK, JANUARY 24, 1833.

Having been requested to state the cause of the fire which occurred in the year 1827, in the store, No. 7 Arcade, then occupied by me, and whether the gas should be condemned as the occasion of said fire, I most unequivocally state, that the same result, under corresponding circumstances, would have been produced from the use of any other description of light. A bottle containing a quart of Cologne water had been placed on a shelf directly above and in the range of the gas burner. The heat caused the fluid to expand until the bottle burst. The spirit then took fire, from coming in contact with the flame, and communicated it to the other inflammable articles contained in the window.

R. D. HART.

No. 6.

I hereby certify that the destruction of property in the store at the corner of Broadway and Chamber street, occupied by me in May last, was *not* occasioned by the use of gas lights, but to the best of my knowledge and belief by the carelessness of the clerk: and that I have ever since continued the use of gas lights in the same store, believing them to be at least as safe as oil lamps.

JOHN J. AYMAR.

New York, January 23, 1833.

REPORT,

Upon an Examination of some of the GAS MANUFACTORIES in *Great Britain, France, and Belgium*, under a resolution passed by the Select and Common Councils of the City of Philadelphia, January 2d, 1834, authorizing the Gas Committee to engage a competent person to proceed to Europe for the purpose of examining Gas Works, with a view of obtaining the best information as to the construction of works, the manner of manufacturing Gas, and in general make such observations as may be useful, in the event of Councils determining to adopt a plan for lighting the City with Gas.—By S. V. MERRICK.

To the Select and Common Councils of the City of Philadelphia.

GENTLEMEN :—

IN pursuance of a resolution of your body, passed on the second of January, 1834, and of instructions from the Committee charged with an inquiry into the expediency of lighting the city with gas, received on the 18th of March last, the undersigned immediately embarked on his destined mission, and during the course of the passed summer has made a careful examination into the various plans and processes, employed in manufacturing carburetted hydrogen gas, for private and public illumination, now in use in the principal establishments of Great Britain, as well as a cursory view of the works in Paris, Brussels, and Ghent.

In conducting these investigations, I have to acknowledge the friendly reception I met with from gentlemen connected with gas manufactories, either as engineers or managers, in most places which came under examination, to whose liberality I am indebted in general for opportunities granted for a free inspection of their works, and in many cases for the entire confidence with which their modes of operation and results were communicated.

The gas works which I visited on the continent, being all of

English origin, and under English control, I was unable to obtain from them any information of material value, not already derived from original sources which had been brought under previous notice. In the course of this communication, therefore, my observations will be confined to comparisons between systems used in England or Scotland, believing that the purposes of the mission will be fully attained by such comparisons as may there be made.

In preparing this report, I have deemed it my duty, upon reviewing the instructions, rather to take a general view of the arrangements and machinery best adapted to the wants of the city, and to point out the system which appears most conducive to its interests, than at this late day to enter into any laboured argument to prove the general expediency of a measure, which has received the sanction of so many years experience.

Arriving in a country, the capital of which consumed during the past year, a quantity of gas, equivalent in illuminating power to nearly forty million pounds of candles, which possesses within its limits and populous suburbs, forty-seven stations for making and storing gas, erected by twelve different companies, who have in their construction profitably invested an aggregate capital of near eleven millions of dollars, and whose arrangements are not now sufficient to supply the growing demand, it appeared too late to inquire, whether gas as a means of illumination, was preferable to any other substance.

If I add to this, the universal testimony of the citizens of that metropolis, and of high public functionaries, as to the moral effect experienced by the facility of producing, at a moderate expense, a brilliant light in the streets and narrow passages, with which that city abounds, adding to the safety, comfort, and convenience of society, it will not be expected that much time will be occupied in demonstrating what is thus forced upon our attention.

If other evidence is wanting to prove the consideration, in which this system is held in Great Britain, I may instance the fact, that during five months traveling in that country, I scarce ever passed a town or village to which the material was accessible, that was not provided with this indispensable means of obtaining light, or was in preparation for it ;—and so great has

been the extension during the past year, that all the foundries which came under my notice were full of contracts for the delivery of pipes and retorts.

As far as I have been enabled to collect the history of these small works, they have generally been erected by the owners of real estate, as an improvement to their property ; and when completed, leased to any individual who would keep them in repair, and pay the best interest on the cost.

Believing as I do, that the formidable objections, raised when this subject came under discussion during the past year, were entirely refuted by the report of the committee, who examined into their truth, and being confirmed in the opinion as to the correctness of the statements made by that committee, it is sufficient to refer to that document, in case such evidence should now be deemed requisite.

In considering the kind of gas works best suited to the wants of Philadelphia, it will be necessary to take a general view of the systems now practised in Great Britain, the materials employed, and the mode of constructing the apparatus for distillation, giving a comparison of the advantages of each plan.

As regards the materials which may be used in the manufacture of gas, to the best advantage, enough has been said in the report of the committee, made to Councils in March, 1832, who carefully investigated this part of the subject, to show how much will be gained by the use of bituminous coal, instead of the more costly material heretofore partially adopted in this country and in Europe:—and I deem it an argument of no small moment in favour of this mode of lighting, that every material used in the fabrication of gas, will be the product of Pennsylvania labour. The bituminous coal from which it is to be made, may be drawn from the rich mines now open in the interior of this state; the fuel from the exhaustless beds of anthracite, and the lime for purification, from our own vicinity;—and not a lamp will shed its rays over our streets, which has not paid a tribute to the internal improvements of the state.

If any evidence be required in confirmation of their opinion, it is to be found in the fact, that the use of oil as a material for the production of gas, has long since been abandoned in both countries, and the works used for making rosin gas; even this

material has failed to make a successful competition against the cheaper substance, having finally given way after a long struggle.

The rosin gas works of Great Britain, have been, or are about to be converted, at a heavy expense, into coal gas works, and in New York the company who are now erecting their works for supplying the upper part of the city, have been compelled in part to change their plan, and adapt them to the use of both materials.

Believing, therefore, that coal in great abundance, and of good quality, may be had for the supply of the works, my attention will be confined to it as a gas making material, and to the plans now in use for its manufacture.

The coals used in Great Britain for this purpose, are various in their properties and values, but for our present purpose may be divided into two general classes, viz. the Cannel or the Parrot coal of Scotland; and the soft or bituminous coal more abundant in England.

The former of these rank highest for the purpose, containing a larger proportion of carbon and volatile matters, with less bitumen than the soft coal; producing a gas highly charged with olefiant gas, and possessing an illuminating power superior to any other known in the kingdom.

This material is in use in Manchester, Stockport, and some other towns in England, and almost universally in Scotland, yielding gas, having a specific gravity varying from 550 to 650, being nearly equal to rosin gas.

The coke from this coal is of but little value in comparison with that produced from the soft coal, being of less bulk than the material from which it is made, and furnishing but a small quantity for sale, after deducting that required for fuel to heat the retorts.

From this material, therefore, but little profit is derived from any product except the gas; but the superior quality of that gas, in connection with the low price of the material, warrants its use in those works which have adopted it, and the proprietors have been compelled to pay undivided attention to increase the quantity of gas, without reference to profit from the residuums.

As in America there is no coal yet discovered bearing any resemblance to this material, it would be useless to dwell here upon the systems used in its carbonization, except as showing the experience of several works, having used precisely the same material, on different systems, and in apparatus varying in construction from each other, but bearing a comparison with those used for the carbonization of fat or soft coals.

I shall advert, therefore, to the Cannel coal works, after treating of the plans adopted in England for the carbonization of the soft coal, among which the Newcastle, yielding about thirty-five per cent of volatile matters, seems to stand pre-eminent in reputation, producing in the usual mode of operating, from ten to twelve thousand feet of gas per chaldron. Specific gravity, from 4. 10 to 4. 30.

It may be proper here to remark, that although the specific gravity of gas will not give precisely its value or power of illumination, still, as a general rule, the approximation is so near, that I adopt it as an indicator of the value of the gas, for want of a more accurate standard, which may be referred to in general terms.

The various proportions in which the component parts are found incorporated in the bituminous coals of Great Britain, yielding gas of different qualities, and more or less in quantity, add much to the difficulty of comparing the several systems of working with each other. The results of all comparisons must therefore be mere approximations, except where coal from the same mines affords the basis.

To seek, therefore, a series of works, in which the same coals were used, appeared to me essential for definite purposes, while I continued to confirm my results by observation elsewhere.

The coal I found in most general use, was that already alluded to, from Newcastle on Tyne, being preferred in London, and on the eastern and south coast of England, to any other within reach; and as some of these works varied in their modes of distillation, it became for all practical purposes, a standard material by which to compare the respective operations of each, diminishing the difficulty of selecting a plan best adapted to our purpose.

The system upon which gas is to be made, at the least cost, first claims our attention, and resolves itself into three points.

1. The expense of fuel and material for carbonization.
2. The expense, in wear and tear of apparatus.
3. The labour attendant upon its manufacture.

This is a subject on which much diversity of opinion exists among gas engineers:—the plan of retort, the duration of the charge, and the temperature at which the process of carbonization is to be conducted with best advantage, are points of controversy among them at this day.

To describe all the plans would be quite useless. I shall therefore confine all observations to those which appear most deserving of merit, and necessary to our present purpose.

The first plan claiming attention is the oven of Mr. King, with which we are familiar at the coal gas works of America. The dimension being five and a half feet wide by six feet long, eighteen inches high at the crown of the arch, and twelve inches at the spring, carbonizing about ten bushels of coal at a heat, or a ton in twenty-four hours.

These ovens are made of thick boiler iron, firmly riveted together, with the bottom of the same material, set in an arch of brick work, heated by one fire, the bottom being shielded with fire tiles, to protect it from the direct action of the flame, with longitudinal flues under it; the draft, passing over the top of the oven, makes its exit in the crown near the front. Some ovens of this description are in use at Liverpool, with cast iron bottoms, but their value has not been determined on by practice. This plan of carbonization, I found no where in extensive use, except at the Liverpool works, constructed by the inventor.

Of the cast-iron retort, there are many modifications, varying in dimension and shape with the caprice of the conductor, and in many cases without any definite idea of the principle to be aimed at.

They may be divided into three general classes :

- 1st. The circular retort, from twelve to twenty inches in diameter, and from six to nine feet in length. This retort is

used in Manchester, and some other places, in general for the distillation of Cannel, or Scotch Parrot coal. It answers for the distillation of a coal which retains its form in lumps, and is advantageous only from the facility with which its position is changed, when partially destroyed by the action of fire on the under side.

2d. The small or London D retort, so called, in consequence of its having first been used by the chartered company in London, being still in use at their works, and recommended by their engineer. This retort is twelve inches broad on the base, eleven inches high, and seven feet long, carbonizing one and a half to two bushels at a charge.

3d. The York D retort, (so called, in consequence of its having been introduced by Mr. Outhit, of York,) and the modifications of it, among which I should include the elliptic retort, as having the same general purpose in view. The difference between the London and York D retorts, consists only in an extension of surface upon which the coal is spread, the latter varying from eighteen to thirty inches in width, and about the same dimensions in length and height.

These cast-iron retorts are set in benches of from two to nine in a set, usually enclosed in an arch of brick work, heated with one or two fires, arranged with shielding tiles, so as to prevent a direct action of the flame upon the metal. Some with ascending, some with descending flues.

To describe the particular mode of setting on each plan, would require drawings in detail; a labour entirely uncalled for, as the proper plans will be prepared of the arrangement deemed most effectual.

In addition to these, I have found retorts, or ovens, composed of fire brick, built in form, or of clay moulded to the shape in the arch constructed to receive it, varying in dimension and shape from two to four or five feet in width, which will be treated of in the sequel.

The plan of retort, and the system of working to produce the greatest quantity of gas, of the best quality, is at present a subject of controversy among engineers; and to form a just opinion, requires a careful comparison of the operations of each.

As the whole economy of gas making depends upon the expense of carbonization, it was an object of much solicitude to obtain from the books at the respective works, such statements of their daily operations, as would enable me to form a correct estimate of their advantages, rejecting mere theoretic opinions and verbal statements, if unaccompanied by satisfactory testimony.

In giving the general result of these examinations, it will not be requisite to record the names of the works, as such a publication would be a betrayal of confidence, highly unjustifiable.

These statements have been generally obtained for a short period of time, to avoid multiplicity of figures ; but have been compared with the workings for much longer periods, often six and twelve months : the results may, I think, be received with confidence.

The following have been taken as the elements of comparison :

- 1st. The quantity of coal used for carbonization and fuel.
- 2d. The product of coke in weight.
- 3d. The product of gas, and quality.

By deducting the second from the first, we shall have the nett amount of material consumed to produce the third element, or product of gas, in cubic feet, its quality being considered generally.

This mode of comparison has been preferred to the more usual estimate of ascertaining the proportion of fuel used, to the coal carbonized ; because the latter method is liable to error, as the quantity and quality of the gas is improved by adding to the temperature at which the distillation is carried on, and consequently increasing the amount of fuel burnt.

In this comparative view, all residuums, save the coke, are rejected ; not because they are worthless, but on account of the great difficulty in obtaining a correct statement of the quantity made, and variation in value of the other residual matters.

The vast quantity of tar and ammoniacal liquor, made in Great Britain, has rendered them so far unsaleable, that the latter is often evaporated under the retorts or flues, and the former accounted of more value, as a fuel for heating retorts,

than as a marketable product. Such residual matters, therefore, in a comparative statement, do not constitute an item of sufficient importance, to affect the result in an appreciable degree, though some difference must exist in the quantity of tar made, when very high degrees of heat are used in the carbonizing process.

The system of carbonization which has longest obtained, and which at the present day is in most general use, is to fill the retorts with coal, leaving space for the increased bulk of the coke, and for the insertion of tools for its removal, carbonizing with a moderate heat, and allowing the charge to remain exposed to the action of the fire for six or eight hours.

The opposite to this, is to charge the retorts with less coal, or a thinner strata, and to increase the temperature, so as to work off all the gas contained in the charge in three, or at most, four hours.

By the first mode of operating, less fuel is required to carbonize the same weight of coal, and the retorts being subjected to more moderate heat, will remain fit for service a longer period of time. It is therefore contended by its advocates, that the saving of fuel and saving in retorts, more than compensates for any advantages to be obtained by the short charge system.

The opposite doctrine is not new, having been held and practised in the early stages of the art, under many practical disadvantages; but the more easy operations on the long charge system, have been practised in a majority of the works using the bituminous or soft coal.

The attention of several skilful engineers has of late been directed to an improvement in the quality, and increase in quantity, of gas produced, which they have effected, in a material degree, by operating with high temperatures and a thin strata of coal.

Their practice has been founded upon the following theory:

That the first products from the distillation of coal, after the water has been evaporated, contains the greatest quantity of olefiant gas, and consequently has the highest illuminating power.

That if this gas be evolved at a high temperature, it carries with it, in combination a portion of carbon, which, at a low

temperature, would not be disengaged as gas, but would pass over as tar.

That, as the process advances, the proportion of carbon evolved diminishes; while the proportion of sulphur increases.

That after the first two hours, the quantity of gas and its specific gravity diminishes in a rapid grade.

To test the accuracy of this theory, certain experiments were instituted, intended to ascertain the quantity and quality of the gas evolved during different periods of its distillation, varying the quantity charged at each time, the temperature at which it was carbonized, and the duration of the process, so as to embrace a fair comparison of the two modes of working.

The first experiment was made with two York D retorts, twenty-two inches broad by seven feet long, charged with two hundred pounds each of Lambton's Primrose (New Castle) coal, heat kept up to a fair red, and continued for nine hours. The result was, that the production of gas, from four hundred pounds of coal, (five bushels) amounted to sixteen hundred and twenty feet, or less than eleven thousand feet per chaldron; that four-fifths of this quantity was evolved during the first six hours, and more than half evolved during the first four hours. Specific gravity 4.5.

The next experiment, made with the same retorts, heated to a higher temperature, charged with one hundred and forty pounds each, and worked off in six hours. The gas produced from this charge of two hundred and eighty pounds, was seventeen hundred and fifty feet, or in the ratio of eighteen thousand feet of gas per chaldron: six-sevenths of the whole product being evolved in four hours. Specific gravity 5.18.

The charge being then reduced to one hundred and twenty pounds to each retort, or two hundred and forty pounds total, was worked off in five and a half hours, producing the same ratio of gas to the chaldron. Eleven-twelfths of the whole product being evolved in four hours; the product in gas, evolved after the four hours, not being worth the fuel taken to produce it.

By carefully repeating these experiments, and taking the specific gravity at various stages of the process, it was found to decrease in each successive half hour, as the work pro-

gressed, after the second or third trial; while the result, as respected quantity, proved equally in favour of the short charge system.

The result of these experiments clearly establishes the fact, that the greatest quantity of gas, and the best in quality, may be produced by working a diminished quantity of coal in the recipient at a high heat.

So far, therefore, as quality and quantity of gas produced are concerned, the principles to be followed are,

1st. An extended surface, and thin strata of coal in the retort.

2d. Rapid carbonization at a high temperature.

From insulated experiments, such as have been detailed, no judgment can be formed on the other points of comparison; although care was taken to note the quantity of fuel used in each experiment, the correctness of the statement cannot be assumed as a guide to continuous work.

To determine the expense of fuel, required under different circumstances, recourse must be had to the continuous operations of works using the same material for carbonization, and dividing the amount of fuel into the product of gas made, instead of the quantity of coal carbonized; for this mode of estimation the reasons have been given.

The statements now presented are from works carbonizing New Castle coal, at four and six hour charges. As I could obtain no returns from works using the same coal at eight hour charges, the comparisons will be confined to the two first, which are sufficient for our purpose.

Station No. 1. London D retorts, area of surface seven and half feet, set two to one fire; the lower retort cased in tiles, and the return flue passing under the top retort, unprotected; the whole covered with a fire brick arch, charged every four hours with one bushel, or 80lbs. coal.

Whole amount of coal, used for fuel and carbonization in pounds,	-	-	-	-	154,800
Deduct coke made,	-	-	-	-	59,166

Total material consumed,	-	95,636 pounds
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to produce 551,387 feet of gas, or to each pound 5.75. Specific gravity 4.8.

temperature, would not be disengaged as gas, but would pass over as tar.

That, as the process advances, the proportion of carbon evolved diminishes; while the proportion of sulphur increases.

That after the first two hours, the quantity of gas and its specific gravity diminishes in a rapid grade.

To test the accuracy of this theory, certain experiments were instituted, intended to ascertain the quantity and quality of the gas evolved during different periods of its distillation, varying the quantity charged at each time, the temperature at which it was carbonized, and the duration of the process, so as to embrace a fair comparison of the two modes of working.

The first experiment was made with two York D retorts, twenty-two inches broad by seven feet long, charged with two hundred pounds each of Lambton's Primrose (New Castle) coal, heat kept up to a fair red, and continued for nine hours. The result was, that the production of gas, from four hundred pounds of coal, (five bushels) amounted to sixteen hundred and twenty feet, or less than eleven thousand feet per chaldron; that four-fifths of this quantity was evolved during the first six hours, and more than half evolved during the first four hours. Specific gravity 4.5.

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The charge being then reduced to one hundred and twenty pounds to each retort, or two hundred and forty pounds total, was worked off in five and a half hours, producing the same ratio of gas to the chaldron. Eleven-twelfths of the whole product being evolved in four hours; the product in gas, evolved after the four hours, not being worth the fuel taken to produce it.

By carefully repeating these experiments, and taking the specific gravity at various stages of the process, it was found to decrease in each successive half hour, as the work pro-

gressed, after the second or third trial; while the result, as respected quantity, proved equally in favour of the short charge system.

The result of these experiments clearly establishes the fact, that the greatest quantity of gas, and the best in quality, may be produced by working a diminished quantity of coal in the recipient at a high heat.

So far, therefore, as quality and quantity of gas produced are concerned, the principles to be followed are,

1st. An extended surface, and thin strata of coal in the retort.

2d. Rapid carbonization at a high temperature.

From insulated experiments, such as have been detailed, no judgment can be formed on the other points of comparison; although care was taken to note the quantity of fuel used in each experiment, the correctness of the statement cannot be assumed as a guide to continuous work.

To determine the expense of fuel, required under different circumstances, recourse must be had to the continuous operations of works using the same material for carbonization, and dividing the amount of fuel into the product of gas made, instead of the quantity of coal carbonized; for this mode of estimation the reasons have been given.

The statements now presented are from works carbonizing New Castle coal, at four and six hour charges. As I could obtain no returns from works using the same coal at eight hour charges, the comparisons will be confined to the two first, which are sufficient for our purpose.

Station No. 1. London D retorts, area of surface seven and half feet, set two to one fire; the lower retort cased in tiles, and the return flue passing under the top retort, unprotected; the whole covered with a fire brick arch, charged every four hours with one bushel, or 80lbs. coal.

Whole amount of coal, used for fuel and carbonization in pounds,	- - - - -	154,800
Deduct coke made,	- - - - -	59,166

Total material consumed,	-	95,636 pounds
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to produce 551,387 feet of gas, or to each pound 5.75. Specific gravity 4.8.

Station No. 2. Retorts and setting the same as No. 1, area seven and a half feet, charged every six hours with one and a quarter bushels, or 100 lbs. coal. Whole amount of coal for fuel and carbonization, in pounds, - - - 69,520

Less coke made, - - - 22,433

47,087 pounds

to produce 222,600 feet of gas, or to each pound 4.6 feet. Specific gravity 4.4.

Station No. 3. York D retorts, setting the same as before, are of a surface twelve and a half feet, charged once in four and half hours, one and quarter bushel of coal.

Whole amount of coal used for fuel and car-

bonization, in pounds, - - - 25,360

Deduct coke made, - - - 8,700

Total material used, - - - 16,660 pounds

to produce 91,550 feet of gas, or to each pound 5.40 feet. Specific gravity 4.70.

Station No. 4. Elliptic retorts, area of transverse section eight feet and one sixth, set seven in a bench, shielded from the action of the flame by fire lumps, covered with a brick arch, charged with two bushels, or one hundred and sixty pounds, every six hours.

Whole amount used for fuel and carboniza-

tion, in pounds, - - - 105,720

Deduct weight of coke, - - - 43,680

Total material used, - - - 62,040 pounds

to produce 308,000 feet of gas, or to each pound 4.8 feet. Specific gravity 4.33.

Station No. 5. York D retort, set same as No. 1, area of surface thirteen feet, charged every four hours with one bushel and a half of coal.

Total coal consumed for fuel and for car-

bonization, in pounds, - - - 23,600

Deduct coke made, - - - 9,240

Total material consumed, - - - 14,360 pounds

to produce 92,500 feet of gas, or to each pound 6.44 feet.—
Specific gravity 5.10.

It will be here seen, that the result of the comparison between the two systems, as illustrated in these five statements, is as follows:

No. 1. London D, 4 hour charges, 5.75 feet to pound.

“ 2. do. 6 hour do. 4.60 do.

“ 3. York D, $4\frac{1}{2}$ hour do. 5.40 do.

“ 4. Elliptic, 6 hour do. 4.80 do.

“ 5. York D, 4 hour do. 6.44 do.

The quantity of gas produced from a pound of material used, and the quality, as indicated by the specific gravity, invariably gives the advantage to the short charge system.

It should be observed, that the coke produced upon this system, is lighter than by the old plan, and the bulk increased. These points being established, we are next to compare the economy of the plans respectively, taking into view the wear and tear, and the labour required to keep up the supply.

It does not necessarily follow that an increased temperature will create a corresponding increase of wear in the retort, as variable heats have a much greater effect upon them than high heats, if they are kept uniform. The results are not so disastrous upon the retorts used in the short charge system, as might be supposed, provided care is taken to keep the temperature the same; but the difficulty of keeping high heats equable, exposes the retorts, worked on this system, to greater risks than by the opposite plan:—to determine, therefore, what will be the duration of them, is difficult, as experience on a large scale has not yet been had to settle this point; although in small works, whose operations have been brought immediately under the eye of the engineer, but little difference in duration has been found between the two plans. Still it would not be wise to draw from their experience conclusions, and refer them to works on a larger scale, which must be entrusted to a greater number of stokers and which cannot be kept so completely under control. In Great Britain the proportion of gas required during the summer months is so small in comparison to the other parts of the year, that during this period a great majority of the retorts are thrown out of service, consequently in a set of

retorts, the usual duration of which is eight months, a sufficient number will be saved to do the work of the other four or summer months; for, except in large cities, the public lighting is entirely suspended during that term, and the private lighting diminished in a great degree.

In a work, therefore, in which the retorts can stand eight months active service, they will require renewal annually to keep the stock whole. In works operating with six hour charges, I have found a better average duration than here stated, and that two complete renewals in three years, being equal to working twelve continuous months, may in general be calculated on.

This duration is more than many works attain, and may be considered the highest average that can probably be allotted to them.

Retorts working eight hour charges, often remain in continuous service eighteen or twenty-four months; indeed I have known them thirty. No economy is derived from such long use, because, although the retort will not leak, the product is constantly diminishing, while the proportion of fuel increases from the contracted space in the retort occasioned by the solid particles of carbon which collect on its internal surface. Indeed this obstruction takes place shortly after the working commences, and the incrustation increases so fast that it is doubtful whether there is much saving effected by retaining a retort in service past one season.

But it is needless to go into minute calculation upon this point. If we lay aside the retorts working eight hours, and form the comparison between those working four and six hour charges we shall find that the additional duration of the last, is compensated for by the diminished number required to do the same work on the first plan, on account of the rapidity of the working, and the additional gas produced from the same material, leaving the wear and tear about equal.

Thus, to make 100,000 feet of gas, in twenty-four hours, by the six hour system, producing 11,000 feet to a chaldron of New Castle coal, would require nine chaldron and four bushel.

Say 41 retorts each, 2 bushels to a charge, 4 charges in 24 hours.

$41 \times 2 \times 4 = 328$ bushels, at 11,000 ft. per chaldron, 100,000 feet.

To make the same gas by the short charge system, at 15,000 feet to chaldron, would require 6 chaldron, 24 bushels coal; say 27 retorts, one and a half bushel to a charge, 6 charges in 24 hours.

$27 \times 1\frac{1}{2} \times 6 = 243$ bushels, at 15,000 ft. per chaldron, 101,245 feet.

Thus the number of retorts required to produce the same quantity of gas, bear the relation of 41 to 27.

Now if the retorts, on the six hour plan, require renewing twice in three years, there will be required, for that period $41 \times 2 = 82$ retorts. While on the other system, lasting but one year, there will be required, 27×3 , or 81 retorts.

Thus, notwithstanding the duration of the retorts upon the four hour plan, is less than upon the other, when the expense of renewal is divided upon the quantity of gas made during an extended period of time, the difference is unappreciable; while the former possesses the advantage of requiring less space, and less capital in the original construction of the works.

From this statement, it is evident that, as the labour must bear a proportion to the number of retorts at work, and the quantity of material to be handled, the advantage is decidedly in favour of the last named plan.

In these remarks, reference has been had to cast-iron retorts only; but so far as the amount of production is considered, they refer equally to the oven of Mr. King.

These ovens, it has been observed, are made of malleable iron, and in point of economy in wear and tear, have a decided advantage over the cast-iron retort, for the work they are capable of, requiring less fuel than many of the other works.

I should be much inclined to adopt them in preference to the cast-iron, were it possible to work them on the short system.

The shape of these ovens is such, as to carry out the principle laid down to the fullest extent, but the extended surface of the bottom renders it impossible to heat them to the requisite temperature, without early destruction to their shape, and soon

rendering them unfit for useful service; but I am not at all certain that the adoption of wrought-iron retorts, of smaller dimensions, would not be conducive of advantage.

The high price of iron in this country, led me to examine with care into the plans in use, and experiments now making in England and Scotland, to carbonize in retorts or ovens made of fire-clay or brick.

The original inventor of these ovens was, I believe, Mr. Grafton, of Cambridge; and one work in Brighton, now operates with them successfully. The manager of the station spoke of them favourably; but I could not obtain an exact statement of his operation, nor could I hear the same good opinion expressed elsewhere, though many had tried them. At one station, I found two of his ovens in operation, which required as much coal for fuel as for carbonization; but this was accounted for in the thickness of the walls, which had been built of nine inch brick.

Independently of the high per centage of fuel, required by the ovens of this material, other difficulties occurred in the use of it which almost proved fatal.

In the first place, it was found that the clay, unless made very thick, was a material of too little tenacity to resist any undue pressure; especially where the separate pieces were joined together by cement; and that any accident, occasioning a stoppage of gas in the pipes, reacted so violently as to burst or injure the retort.

This difficulty was remedied by building stays or ties into the retort, connected with the outer arch. But the evil most difficult to be cured, was the tendency to leak at the junction of the cast-iron mouth piece, and at the joints, owing to the contraction and expansion of the material under different temperatures.

When the retorts are first brought to their heat, time will elapse before the cement in the joints attains the consistency of the other material, and becomes entirely gas-tight; but, while the temperature is kept uniform, little difficulty is experienced when once they have been made tight.

The constant variation in demand for gas, makes it incumbent on the manufacturer to vary the number of retorts in ac-

tion, as it increases or decreases. Hence the necessity of letting down the retorts; an operation during which the joints, being the weakest part, give way, as the brick contracts; and it is more difficult to refill these cracks than to make the original joints with fresh brick and cement. This difficulty has been partially overcome by filling the joints, before reheating with clay cement, and washing them with a mixture of salt and potash, or some other glaze.

To produce a perfect retort of clay, the only desideratum wanting, is such a combination of material as will not be subject to change of dimension, from any change in the temperature, so that the fires may be let down and rekindled without causing a waste of gas.

To this end, Mr. Spinney of Cheltenham, an engineer of practical knowledge and skill in his profession, has instituted a vast number of experiments, and succeeded by a mixture of fire-clay, pipe-clay, and silex, in producing the desired results.

The Cheltenham works, under the charge of that gentleman, are provided with retorts or ovens of this description entirely; and the operations of that company are conducted in a manner highly beneficial to those interested, and to the public.

Heretofore, single ovens, of a dimension smaller than Grafton's have been used by him, each heated by one fire, and while the quantity of gas from the coal carbonized, is quite as much as would be produced by the same system of working in iron retorts, the fuel account is materially increased—the great saving being in the wear and tear, an item reduced to a very limited amount.

In some new benches erected, Mr. Spinney has reduced the size of the retort still more, and set two to one fire, carrying on the carbonization at a lower rate than with the single oven; but this bench has not been in operation long enough to decide whether the saving in wear is not more than compensated by increase of fuel; though, as far as a judgment could be formed, the result was satisfactory.

It should be observed, that these works were operating with eight hour charges, and therefore not obtaining all the

advantage which might accrue from using an indestructible material.

I am inclined to think, however, that the clay retorts will be found a valuable acquisition to the gas maker in this country, and am confirmed in this opinion after examining the works of Scotland, in two of which the clay retorts are in constant use, with highly beneficial results. Here, as well as in England, immense difficulties have been encountered in bringing them to perfection; but their efforts have been crowned with success.

At the work in Glasgow, a fair example is offered of the value of this material, in comparison with iron retorts, in both of which the same species of coal is carbonized.

The principles laid down, of working at high temperatures, are here carried to a greater extent than any work in England, seven or eight charges being worked off in twenty-four hours, each retort being made to produce near five thousand feet of gas in that period.

To enable cast-iron to stand such excessive heats at all, it is necessary to shield them at all points with fire lumps, rendering them as inaccessible to the action of the fire as if they were composed entirely of clay. The result is in this case, that the fuel account is quite as high as with the clay, while the wear and tear is ten to one in favour of the latter material; for with their utmost care, it is difficult to preserve the iron retorts more than four months, while the clay lasts from twenty-four to thirty months, and costs far less in construction.

The difficulty which exists in the iron retorts of contracting internally, in consequence of the deposit of carbon, has here been remedied in the clay retorts, by occasionally leaving the interior in contact with the action of the atmosphere a few hours, while at a red heat, the oxygen of which combining with the carbon, separates it from the clay surface.

In the work alluded to, the most decided preference is given to the clay retorts, where, as well as at the Paisley work, which operates with brick retorts on the same principles, the quantity of gas procured from a pound of coal is ten or twelve per cent. greater than in those works using the same material,

where milder heats, incident to the use of cast-iron, are in practice.

Although from a careful examination of this subject, I feel persuaded that the use of fire-clay retorts will be found more conducive to economy than those made from any other material in this country, (where the price of iron is more than double its price in Great Britain, and that in the event it will be resorted to,) yet I am by no means prepared to recommend its immediate adoption.

We have no reason to suppose that our skill will enable us to bring to perfection, at once, a material which has cost so much labour and loss to experienced engineers, who have for years been endeavouring to bring it into successful operation, and who have not yet brought it to that state of perfection of which it is evidently susceptible.

The immediate success of an infant gas manufactory depends so much upon the first impressions with which it is received by the public, that it would be unwise to abide any risk of failure, by stepping out of the beaten track at the commencement, and I should by no means recommend any change from plans already known and well tried.

It will be ample time to make experiments for the improvement of the process and apparatus, when experience has made us masters of the business.

I have therefore selected as the most suitable for the purpose, the retort described as the York D, of cast-iron, set in such manner, with three to a fire, as will allow of the substitution of the clay retort, whenever such a change in the system of operating is deemed adviseable.

This retort has been selected, because, under all circumstances, it appears to be the one with which the principles laid down may be carried out with the best advantage, being large enough to give them free scope, and least likely to become distorted by the high heats to which it may be subjected in the process of carbonization.

Having in the preceding remarks attempted to show the system to be pursued for the carbonization of coal on the most economical plan, our attention is next called to the capacity of

works required to meet the wants of the city, the mode of construction, and their location, before proceeding to describe the machinery in detail.

To determine the ultimate demand for gas, to supply with light an improving city like Philadelphia, is a task for which we can command no certain data, and which, if attempted, must be purely hypothetical.

Before planning new works, the usual and most natural course is to make an approximate estimate of the wants of the place, and probable demand ; but in most old works that have come under notice, laid out upon such estimates, the demand has increased of late years so unexpectedly, that the sites and arrangements are found far too limited for present purposes, and the respective parts of these establishments are in many cases disproportionate to the work required of them.

To plan works on any hypothetical calculation as to eventual demand, would without doubt be a fruitful source of error, requiring some parts more extensive than would at present be required, with the risk of their being too small for future exigencies.

Such estimates, therefore, are only requisite for the purpose of determining the size of the leading mains, or great arteries, for the transmission of the gas from the works to the city, which without doubt ought to be laid of sufficient capacity to meet any contingency ; but for the works themselves, the estimate of capacity should be confined to the probable present demand, and the establishment constructed complete as a whole to meet that demand, leaving the future wants to be supplied by a similar range of works constructed by the side of the original establishment.

The advantages which may be expected from such an arrangement, I apprehend will be,

First,—That the works may be built upon a uniform and symmetrical plan, with the capacity of each part calculated to meet the wants of every other part.

Second,—That no unnecessary capital may be expended in preparing, on a scale commensurate with future wants, parts of the work now required of a small dimension—such as purifiers, condensers, &c.

Third,—That in any future increase, the fullest advantage may be derived from our own experience, and the advancement of the art elsewhere, in adopting improvements that may occur.

A fourth reason for recommending the plan of a series of minor works has forced itself on my attention, while passing through some of the great works of England, viz. : the difficulty of preserving a uniform system of working, and of placing individual responsibility on the workmen engaged in managing long ranges of retorts.

I have scarce ever seen in a large work a uniformity of heating, or found the superintendent who could form an accurate judgment of the results of any particular mode of operation.

In such establishments, a general knowledge of average operations can be readily attained, but nothing definite. It is all important in a work where so much depends upon the care of stokers, that means should be in the hands of the manager to judge accurately of the operations of each, which can only be effectually done by subdividing the work, having a station meter attached to each division, to record the product of every bench of retorts. I have generally found small works doing much better than those upon a large scale.

It is probable that the cost of labour will be a little enhanced during the summer, when full work is not required; but this disadvantage will be more than counterbalanced by the important benefit that will result by being able to keep the operation of the works under the most perfect control.

In selecting a site upon which to construct the works, the choice must be governed by very simple principles.

The specific gravity of the gas being less than that of atmospheric air, the natural tendency of that fluid is to ascend; the level therefore, of the distributing station, should be at the lowest point of the plane to be lighted. Such a location is always desirable, and if it can be obtained, should be preferred; but as it is not always practicable, experience has shown that considerable depression may be overcome without affecting in an undue degree the equality of the issue at the burners.

When great descents are to be overcome, distinct stations are deemed necessary, effectually to attain this object. I apprehend that without resorting to this expensive mode of regulation, depressions of forty feet may be overcome in a district so small as this city.

The evil resulting from inequality of pressure is most felt when the gas is sold by the time of burning, and not by the quantity consumed.

In the former case the consumers are very careless about regulating the issue of their gas, as the expense to them is unchanged, and the cost of the additional quantity consumed by those burners, placed on an elevated position, is borne by the gas maker. If, however, the meter system is adopted and carried into universal effect, the consumers take care to regulate their flame to their own wants, and no loss accrues to any one.

Other important considerations in fixing the location, are convenience to navigation, to a coal market, and to a market for vending coke. All the materials used in the manufacture of gas are bulky, and consequently of expensive transportation. To avoid this additional cost is a matter of paramount importance. It is fortunate that the natural position of the city is such, that an easy distribution of gas is compatible with all these objects.

Under the view here stated, it is only requisite to enter into an estimate of the capacity of works suitable to the immediate wants of the community, giving a general idea of the probable cost of their construction.

This estimate will be based on the supposition, that the most populous part of the city will first claim the attention of Councils, and that provision for four thousand public and private lights, will probably be sufficient to meet the demand for two or three years, divided in the ratio of three hundred public and thirty-seven hundred private burners. In estimating the capacity of the works for the supply of this demand, the greatest quantity of gas required in any one night, must be the basis of calculation.

Say 300 public lights burning thirteen hours, at four feet of gas per hour, $300 \times 4 \times 13$,	-	-	-	15,600
3700 private burners, average time of burning 4 hours at 4 feet per hour, $3700 \times 4 \times 4$,	-	-	-	59,200

Total gas required in one night, cubic feet, - - 74,800

It has already been shown that the retorts recommended, will carbonize one and a half bushels of coal at a charge, which at six charges in twenty-four hours makes a total of nine bushels of coal to each retort.

How far we may be successful in obtaining a coal, which will yield a quantity of gas equal to the New Castle coal, is yet to be determined; but I feel warranted in saying that there will be no difficulty in obtaining a material to produce twelve thousand feet of gas to the chaldron; and shall, therefore, estimate the produce of each retort at three thousand cubic feet.

To insure against accident and loss in distribution, there will be required a bench of thirty retorts to produce this quantity; and, on that scale, recommend that the works be constructed.

In stating this proportion of public and private lights, it should be observed, that the ratio is likely to diminish after the pipes pass into streets less occupied for business, until the gas is generally introduced into private houses.

In estimating the cost of the station here described, it must be observed that the data is of the most general character, because, until the location is fixed, the works laid down in detail upon plans, and a knowledge is had of what walls, leveling, wharves, &c. are required, no accurate estimate can be given.

It is sufficient for our present purpose to say, upon a comparison with similar stations in England, and making due allowance for difference of cost in the two countries, that the station here noticed will not exceed thirty-five thousand dollars, and probably come much under that sum. This is exclusive of mains to convey the gas into the city, or effect its distribution when there; but includes the retort-house, gasometers, and all other apparatus necessary.

After taking a view of the carbonizing process, a brief sketch of the machinery required to prepare the gas for use, and distribute it over the city, will close this part of the subject.

After leaving the retorts, the gas passes through a large pipe, termed the hydraulic main, in which it deposits a part of the tar and ammonia which flow into their proper receivers, and itself goes to a vessel called the condenser.

The process of condensation first claims our attention, and on the judicious selection of apparatus for this purpose, will depend, not only the ready purification of the gas, but prevent an accumulation of offensive matter in the street mains.

The general impression appears to have been, that the only requisite to insure a perfect condensation of gas, is a reduction of temperature; but it would appear from some circumstances, that more is required, and that the process is effectually completed only by bringing the gas into contact with cold solid substances. In some of the works in Scotland, this principle is carried out to an extreme length, and their condensing apparatus is arranged so as to filter all the gas through vessels filled with "fern," "oak twigs," "stones," or any other substance, the effect of which is to separate the particles of gas from each other during their passage, and bring in contact with the substances through which they pass. So far as observation leads to a correct opinion, it would appear that works in which a reduction of temperature alone is regarded, the condensation is but imperfectly completed; but when means are taken to bring the gas in contact with solid substances by filtration, or a constant change in the direction of the conduit, the effect is made evident by a more perfect condensation.

In works which have come under notice, the condensers are made in every variety of shape which suited the views of the constructor; without, however, in many cases, keeping in mind these principles. While it would be a useless task to describe each variety, they may be divided generally into two classes: the air, and the water condensers, or those in which the temperature is reduced by the action of the air, or by immersion in water.

The water condensers are usually either pipes immersed in water, or oblong boxes of cast iron, communicating at their

ends, and extending from two to seven hundred feet in length; or in some cases, upright pipes, connected at the top and bottom, surrounded with a cast iron tank, filled with water.

The air condensers are usually a series of upright pipes, connected at the top and bottom, having vents at the lower bends for the discharge of the condensed matters, tar, &c.

The general principles upon which this part of the apparatus is to operate, being known, its form may be varied to suit the circumstances of the place in which it is to be erected; and that form which is the simplest, taking up the least space, and which costs the least money, is undoubtedly to be preferred, provided it will perform its functions with equal certainty. As the air condenser comes under all these conditions, I give it the decided preference, taking care to vary its form from the mere series of pipes, so as to increase the surface with which the gas may be brought in contact.

The first impressions natural to a view of this condenser is, that during the heat of summer, the temperature of the atmosphere may be so high as to disable it from producing the desired effect; but this is not the case, for by the aid of a small stream of water, sufficient to keep the outside of the pipe moist, an evaporation takes place which reduces the temperature as low as is desired, while at all other seasons the object is gained by an exposure to the air alone.

The usual mode of construction is to erect the pipes on the north exposure, protected from the direct rays of the sun, and appears in many respects preferable to the water condenser.

The tar and other condensible substances having been deposited from the condenser into their proper receivers, the volatile products, or gases, flow to second vessels, called purifiers.

The volatile products from the distillation of coal are various in their nature and properties, being valuable for the purposes of illumination, in proportion as the pure olefiant gas and carburetted hydrogen can be separated, and preserved distinct from the other products.

To separate these valuable gases from the others, numerous

plans have been put in practice successfully, but all with the same agents.

The heavy or condensible matters have all been partially disposed of; but there still remains in solution some portion of ammonia, and all the gaseous products which cannot be condensed.

To effect an entire deposition of ammonia, requires the presence of water, for which it has a strong affinity, while lime has been found the best material for depriving the gas of sulphur, the impurity held in the largest quantity, and of the most deleterious quality. The effect produced by its presence during the combustion of gas, is to send forth a suffocating odour, and to tarnish metallic polishes whenever it comes in contact with them.

Water and lime therefore being the substances best adapted to separate the impure matters from carburetted hydrogen gas, it naturally followed that a solution of lime in water was first used for the purpose of purification, and vessels on various constructions rendered subservient to this purpose, by passing the gas through the liquid, keeping the lime in solution by constant agitation, and changing the water whenever the application of gas to paper saturated with acetate of lead or nitrate of silver, was found to produce a change of colour; experience soon taught the operators that it was requisite to wash the gas in three distinct changes of water to free it entirely from its impurities.

So far as regards the economy of material only, this plan has undoubtedly the advantage, because the particles of lime, being held separately in solution, may each individually be brought into contact with the gas, and be saturated with impurities; an effect which cannot be produced so perfectly when the lime is not held in solution, owing to the amalgamation of many particles together, which protect each other from the action of the gas.

This process, however, must, in some degree, prove a nuisance, from the difficulty of getting rid of so large a quantity of liquid material, impregnated with nauseous vapours.

To avoid the disagreeable effects, upon persons residing in the vicinity, by whom complaints were often made, recourse

was had, in many cases, to a discharge of this refuse underground, into neighbouring rivers or streams; but when this was deemed objectionable, extensive cess pools were resorted to, from which the liquid was gradually conveyed under the retorts and evaporated. By any mode, the discharge of this fluid is troublesome, and requires great care to prevent its becoming offensive to those residing near the works.

The disagreeable nature of this residuum led Mr. Phillips, of Exeter, to propose the purification of gas by means of dry lime, and to construct the proper apparatus for its use. The plan proposed by this gentleman, with some modifications, has obtained precedence very generally in Great Britain; and is now adopted, except in some of the larger works, which still adhere to the original plan of wet lime.

The original expense of material, by the dry lime process, may generally be considered as double that which is incurred by the wet lime process; but this cannot for a moment be considered, when placed in connection with the entire freedom from nuisance; of which the dry lime process is susceptible.

It has been said that the presence of water is necessary to absorb the ammonia. The process of Mr. Phillips was called dry lime, in contradistinction to the lime cream or wet lime plan; while, in fact, the lime is saturated with water to a consistence that would adhere, if pressed between the fingers.

In some cases, this admixture of water, together with the condensation, was deemed sufficient to free the gas from ammonia; but the process being imperfect, recourse was had to washing the gas in clear water, previous to condensation, with success. It has been found advisable to pass the nascent gas from the hydraulic main, through a reservoir of pure water, which takes up much of the ammonia that would otherwise be lost; producing a highly saturated liquor of value, and materially assisting the process of condensation.

The dry lime purifiers, consist of a series of large square boxes of sheet iron, having projections placed on the sides, to receive sieves or wire gratings, upon which lime, slacked and moistened, is laid in strata of one to three inches thick, as lightly as possible, so as to allow the gas freely to percolate

through. At the Paris works, a strata of fern, or moss, is spread on the sieves under the lime, to assist its free circulation.

Considering therefore, that the works may, if properly arranged, be freed entirely from all offensive or disagreeable odour, by the adoption of the dry lime system, it appears to me far better to overlook the difference between the economy of the two plans, and adopt it in any works to be erected in this city.

In the construction of gasometers, many improvements have been made of late years, tending to reduce the expense and simplify their action.

The constructors have at last discovered, that as gas may be safely retained in a vessel no stronger than a silk balloon, there is no occasion for building gasometers strong enough to retain steam, and the heavy iron and wooden framings with which they were formerly encumbered, are dispensed with. No ribs or braces are now inserted, except such as are required to keep the vessel in shape until filled with gas.

The capacity of gasometers must, of course, vary with that of the works. It is not generally the custom, but I think judicious, to have nearly as much gasometer room as the retorts can fill in a day. In many instances the disadvantage, from being cramped in gas store-room, I found very manifest. In the depth of winter, when the demand for gas is at its maximum, the want of an adequate supply, in store, is often severely felt; and, in some cases, resort has been had to working extra benches of retorts for the night only. The consumption of fuel during the day, to keep up the heats for night work, must necessarily be very disproportionate to the object gained.

The necessity of letting down retorts, during the suspension of public lighting upon moon-light nights, is an evil which can only be remedied by an excess of store-room. Indeed, in many places, where the capacity of the gas holder is too limited, it is found expedient to keep the public lamps lighted during moon-light nights, rather than incur the expense of letting out and reheating retorts.

It is believed, therefore, that true economy points out the policy of a full share of store-room, notwithstanding the expense is considerable, especially in a new and growing work where extensions may be looked for very soon.

The store-rooms being determined, the capacity of the gasometers must approach the quantity already named of seventy-four thousand feet.

To avoid accident, it will be judicious to have this capacity divided into two vessels, which will fix the size at fifty feet diameter, by eighteen feet deep, vessels well proportioned and of convenient dimension.

Gasometers of this size do not require counterbalancing, as the pressure upon the gas, to sustain the whole weight, will be less than the resistance due to a column of water three inches high, a pressure quite convenient when the weight of the gasometer is not used to regulate the flow to the burners.

The usual method now adopted to equipoise large gasometers, is to insert cast-iron frames on the top of the tank, with guide rods and friction rollers to preserve a steady motion up and down, allowing the vessel to play upon the gas within.

This plan is far preferable to the old plan of suspension from the centre of the gas-holder crown, which was liable to the objection of creating a flickering in the lights, whenever the vessel was agitated by external causes. Another method of suspension has lately been put in practice, which answers even better than the guide rods, for keeping the vessel steady. This is to suspend at three points, with chains tending to and terminating at one point, by a triangular frame of wood work; to these chains connected a counterbalance was hung.

The plan of triangular suspension has one decided advantage, in a climate liable to falling or drifting snow. The weight of snow falling on one side of the vessel will not affect its perpendicular position, while, with the guide rods such an accident might affect the free play of the gas-holder.

On the whole, the triangular suspension appears preferable and the expense not much more than the guide rods, the weight required being merely sufficient to keep the gas-holder steady.

The practice of enclosing gasometers within buildings, which from their size, must entail a heavy expense on the establishment, has long since been abandoned, and they are now universally placed in the open air, even in the northern part of the island, where the climate is quite as severe as that in which we are placed. There may perhaps be seasons in which the extreme severity of the weather will affect the water in the tank, but in general the constant supply of fresh gas at a temperature much above freezing point, will prevent any accident from impeding the free motion of the gasometer, while temporary precautions may be taken, if ordinary means should fail.

The liability to frost is the only objection which can be raised against the exposure of gas holders in the open air, and the ease with which that evil is guarded against, precludes the necessity of incurring the heavy expense incident to the construction of buildings.

There is another advantage, however, which ought not to be overlooked; I allude to the impossibility of any serious accident occurring from the explosion of gas in vessels placed in the open air.

It has been shown on a former occasion, that the only time a gasometer can be put in a condition liable to explosion, is during the act of expelling the air and introducing the gas in the first instance, but, that afterwards if a rent or hole be made in it, the only evil that can result, is a loss of gas; for the weight of the gasometer will cause the gas to flow out of such hole, and entirely prevent the admission of atmospheric air to create an explosive mixture within. It is clear, therefore, that if the gas escapes by accident or design, the loss in the open air is the sole evil to be apprehended, as an explosive mixture cannot be formed outside of the gasometer, there being no building to confine it. The danger from explosion is an evil, the fear of which has long since passed away in all places where gas is in general use. It is there looked upon as an idle chimera.

The nature and properties of gas are now so well understood, and the precautions to prevent accident so well known, that notwithstanding the immense number of works existing

at this time, a disaster is of rare occurrence, and when it does happen, the injuries are not extended as formerly, beyond the damage done to the vessel itself, where the explosion takes place.

The tanks to contain water, into which the gas-holders are inverted at some works, are cast-iron plates bolted together, with a bottom of same material, but more generally of brick or stone, having the bottom well puddled before the pavement is laid, and the outside round the wall secured in the same way.

The latter method is preferable, whenever the nature of the ground will admit of such a structure, both on account of the greater economy in the construction, and because the brick being a worse conductor of heat than iron, the water is less liable to be affected by frost. In such cases it is usual to sink the tank entirely beneath the surface, thus keeping the gasometer as low as possible.*

Having disposed of the gas when made in its store-houses, we have to consider the mode of distribution to the consumers, and the regulation of the pressure, so as to insure an equal flow at the burners, points which materially affect the value of the works as a source of public convenience.

The gas is conveyed through the streets in mains or pipes of cast-iron, to determine the proper size of which has heretofore been a difficult task, and one which has proved a fruitful source of error and vexation.

To avoid the heavy expense incident to laying down great mains, engineers have often erred on the other extreme, and contented themselves with pipes far too small for the wants of the public; an error which has in some cases led to a useless expense in laying mains unnecessarily large.

Unfortunately, there are even at this day, no fixed principles known respecting the flow of æriform fluids which will guide us surely in determining this point; but we must be guided by

* The accident which recently occurred at the Ratcliff works, London, where the gasometer tank, (being an old brewhouse vat,) burst with the weight of water, shows us the importance of sinking the tank under ground, to prevent the possibility of such a disaster.

the experience of others, applying as nearly as possible their practice to our circumstances.

Before entering upon this subject, it is proper to determine the quantity of gas which will be required to pass the leading mains in a given time, and the location of the works from which the mains are to be laid.

The first reply as to the quantity of gas required, must be a mere assumption, for no one can prophesy the extent of the demand.

In Great Britain, it has, in growing towns, almost invariably exceeded the most sanguine calculations, and we are not likely to be behind hand in appreciating an improvement, when the value is once understood.

I cannot assume, however, a demand of less than twenty thousand lights, including public and private; suppose for the eastern front of the city fourteen thousand, and for the western front six thousand, consuming an average of four feet per hour.

To supply the eastern front, (dispensing with gasometer stations,) will require to be passed in one hour $14,000 \times 4$, equal to - - - - - 56,000 feet

Western front, 6000×4 , equal to - - - 24,000

Total consumption in one hour in cubic feet, 80,000

In estimating the size of the mains, it is requisite to know the location of the works, because, if they are to be placed on the eastern front either above or below the city, it is clear that the mains must be of a capacity sufficient to pass the whole quantity within the city limits; but if the location formerly selected be still adhered to, on the western front, then the part of the city between the works and Broad street, may be supplied direct from the works, while the main need only be of a capacity to pass that portion required for the eastern front.

By this means, Broad street will be the point from which the draught on the main will commence, and to which the pipe must be of sufficient capacity to convey the whole quantity required as fast as it is consumed on the eastern front of the city.

By ascertaining the delivery of gas through mains, in such cases as I have been able to make observation, I have found one instance of a six inch main, extending the same distance, in which a pressure of six-tenths of an inch was ample to deliver the gas at a velocity of ten feet per second. Taking into consideration the difference of friction in a pipe of such dimension, and in one, the capacity of which will be sufficient for our purpose, we may feel quite safe in laying a main which will pass the required quantity at the same velocity, or even something less. The discharge through the main alluded to, being seven thousand feet per hour at that pressure, or one-eighth the quantity stated before, the main, according to this rule, must be eight times the capacity, or seventeen inches diameter; but as the rubbing surface, or area, in proportion to the quantity passed, is so much less in the latter than in the former, I should not hesitate to reduce the size to fifteen inches diameter, believing that the proportional diminution will be compensated for by the difference in the friction.

In this I am confirmed by reference to another instance, where 23,000 feet per hour is passed five-sixths of the distance through a main ten inches in diameter, which would give the size required to pass 56,000 feet per hour, by the same rule, $15\frac{5}{8}$ inches diameter; this example shows a decrease of friction in greater ratio than in the length of the pipe.

Whether this main of so large dimension should be laid at once, or divided into two, of half the capacity each, may be hereafter determined, when the plan of distribution comes under final consideration; it is sufficient for our present purpose to know the whole size which will be required.

The capacity of this main has been considered, without reference to any assistant station for storing gas or regulating pressure.

It will be recollected that, on a former occasion, the committee of councils deemed it necessary to appropriate a station on the eastern front for this purpose, and designated the public lot in Dock street as a suitable position. In doing this, they certainly acted with sound judgment, believing that the regulating station there, would have great effect in preserving an equal flow of gas from the burners in all parts of the city;

and it is quite possible that a resort to a regulating station on the eastern front may, in the event, be found not only useful, but necessary. As, however, there seemed to be a strong objection among many citizens to such a disposition of that lot, I took some pains, by comparing the situation of this city with others, to ascertain whether the descent from Broad street was likely to effect the flow to such a degree as to render an easy regulation impracticable, and now feel satisfied, that if the mains are of ample size, no difficulty will arise in distributing from works on the Schuylkill, without any auxiliary stations whatever.

If experience shall testify to the correctness of this opinion, a very heavy expense in stations will be saved. It is possible that a difficulty may occur on the eastern wharves, which being the lowest point, may be affected by unusual draughts from above. The only evil to be apprehended is, that as there will be an excess of pressure on the upper burners of four-tenths of an inch over those on the lower level, the size of the apertures in the burners will require to be varied, to meet the difference in the rapidity of flow ; an inconvenience of no great moment, as it will affect principally the burners below Front street, where more than half the depression takes place.

It is not, therefore, deemed expedient to take any measures to provide for the regulation of pressure beyond what may be accomplished at the manufactory, until experience proves the necessity.

The mode adopted in some works, for regulating the flow to the burners, is by taking off, or adding to the weight which counterbalances the gasometer. But this is a clumsy and laborious plan, one likely to prove defective, unless the gas-holder is nicely poised with compensating weights. Instead of this arrangement, the conical valve has been substituted, which, by being closed or opened, regulates the quantity of gas flowing from the gas-holder through the exit pipe, by changing the size of the opening.

This valve is sometimes opened by hand, but its regulation by the judgment of the workmen, does not in all cases answer the desired end, for if a number of lights are suddenly extinguished, the additional pressure on the pipes causes an excess

of flow, through all the remaining burners ; thus, although long experience enables the workman to regulate with tolerable certainty, yet errors and loss of gas will constantly happen.

To remedy this evil, a self-acting governor has been put into use, which consists of a small gasometer, to which is attached the stem of the conical valve. This gasometer is counterbalanced to the weight required to force the gas to all the burners. Any change in the consumption of the gas, operates at once to raise or depress this gasometer, and of course regulates the flow by closing or opening the conical valve. Thus with a self-acting governor, the flow and pressure upon the mains is regulated with great nicety to the exigencies of the moment, requiring only that there shall be more weight upon the main gas-holder than upon the smaller one.

The plan for laying pipes as usually practised, is perfectly well understood here, differing from water-pipes only in one particular, that is, a regular grade of elevation and depression must be preserved, in order to give a descent for the flow of condensed water, (which sometimes accumulates in the pipes,) to certain points where it may be received into suitable receptacles, and removed, otherwise an obstruction in the flow of gas might occur.

These recipients are called syphons, or more properly condensed water-boxes, and are to be provided at every point of depression.

The mains require to be laid out of reach of the frost ; in this climate from eighteen to twenty-four inches below the surface. They are usually laid on each side of wide streets, or if narrow, one row in the middle is ample, the openings or trenches being made and closed on the same day, so that the passage of the street is never materially impeded to the inconvenience of travelers ; so slight a trench being made, that the earth is easily rammed in and the pavement relaid without waiting for the natural settlement of the earth.

A method has been partially adopted lately, which I think far superior to the old mode, in all cases, where the pipes are laid over solid ground. By this plan the hubb of the pipe is bored, and the small end turned each with a very slight taper. The two ends of the pipe being covered with a mixture of

white and red lead, are entered, the small end into the hubb, and driven home with a mallet. The joint thus made is perfectly tight, and the taper so slight, that no contraction by change of temperature will render them subject to leak. It is plain that this mode of making joints can only be carried into effect in straight lines, or with slight curvatures, in all other cases the old plan of lead joints must be resorted to.

Where the lines are straight as in this city, great facility is presented for using the bored and turned joints, which are undoubtedly preferable to lead joints wherever they can be introduced.

The service pipes from the street main to private meters are sometimes made of small cast-iron tube of three-fourths or one-inch diameter, but more generally of malleable iron or lead. The use of malleable iron for this purpose has been almost universal, but it has been found, that whenever it comes in contact with ashes, gravel, or sand, it is acted upon and destroyed in ten or twelve years, while in clay no such difficulty is experienced.

The extreme ductility of lead, which is often used, renders it objectionable ; being liable to short bends, in which water may lodge, and obstruct the flow of gas. To obviate this, lead pipe is sometimes laid in grooved brick, which effectually overcomes the evil, while the expense is enhanced beyond that of iron-pipe.

For internal tubing lead or tin is often substituted in place of copper, of which metal the small tubes were formerly almost universally made.

It has been found that the hard solder joints of the copper tubes were apt to crack in the bending, the cracks being almost imperceptible, but still sufficient to cause an escape of gas, and an unpleasant smell. The tin or lead, being too ductile to crack, answers the purpose exceedingly well, in all places where the pipes can be supported in a straight line. The apparatus for internal fittings, burners, &c., are as various as the taste of the maker or consumer may desire. Samples and drawings of most of those made at Birmingham are in my possession ; together with the prices of every article appertaining thereto.

After thus taking a view of the most approved process of manufacturing gas, and plan of distribution, there remains several points, to which, by the instructions, my attention has been directed ; among the most prominent is the nature and disposition of the residuums left from the carbonization of coal.

The only residuums which will be available, are the coke, the ammoniacal liquor, and the tar.

For the coke, there is no doubt, an ample market will be found. The high price of charcoal, for which it is a substitute of value, both for the use of founders and for culinary purposes, ensures for it a ready sale ; the price bearing a proportion to the cost of the coal from which it is produced.

The ammoniacal liquor is useful for the manufacture of sal-ammoniac, and sells for a small price in Baltimore, where there is a manufactory of that article. The produce of a chaldron of coal is from 20 to 30 gallons, but need not be considered of much value here for some years, or until a sufficient quantity is produced to make it worth manufacturing ; for the cost of transportation to Baltimore would make that market of little avail to the works in this city.

The last residuum is the tar, which, in many ways, is of value.

It will sell, in its raw state, for a fair price ; but when the quantity is considerable, a good profit may be derived from it, by extracting the naptha, now an article used to some extent in the manufacture of gum elastic ; which leaves, after distillation, about half its bulk of concentrated tar, more valuable than in its original state. Of the process of manufacturing the naptha, I have obtained a description. Under all circumstances, it is extremely valuable as a fuel for heating the retorts. Three gallons being estimated, for that purpose, equal to a bushel of coke.

The consumption of tar as fuel, in connection with an equal quantity of water, is practised in some works ; and the advantages derived from this combination being doubted, have elicited much spirited controversy during the past summer : to this plan my attention was called, during a visit to Mr. Rutter, the inventor, at Lymington. It is the usual custom, in most gas works not situated convenient to a market for tar, to consume

their product, by conveying it through a tube upon the red-hot bed of fuel on the grate bars. This process, from the quantity of smoke discharged, and the deposit of solid matter on the other fuel, gave clear evidence of the imperfection of its combustion, and that but a small quantity was made available for the purpose of heating the retorts.

To give the burning tar, in which the carbon is in excess, its due proportion of hydrogen for the production of flame, and oxygen for its support, Mr. Rutter introduced a portion of water, by the decomposition of which, a complete combustion of the tar was effected, and the whole of its heating properties made available.

Without taking any part in this controversy, I may be permitted to say, that in no works in the kingdom, which came under notice, was there any thing like so perfect a combustion of the tar, as in those where this process was used, and I had a fair opportunity of comparing the economy of the heating process with and without its use, in the same works which gave decided evidence of the saving effected by the plan of Mr. Rutter.

The prices at which the residuums are sold, being dependent entirely on local circumstances, vary so much, that no useful purpose would be accomplished by detailing them. In some works, the price of coke is fixed from time to time, to cover the price of the coal used to make it, and the other residuums considered of no value for sale. In others, on the contrary, the coke is quite unsaleable, and consumed, as the only means of getting rid of it. At some works, too, the refuse lime is sold for prime cost, as manure, being considered, from its strong impregnation with ammonia, as being improved in quality for that purpose; in other places, where lime is not valued as manure, this product is but refuse.

For the value of these residuums, we must refer to our own circumstances, and are justified in saying, that the ammoniacal liquor will be of little moment for some time to come, but that the lime, tar, and coke, will produce valuable results; indeed, for the latter, an offer has already been made for more than the works will supply.

In disposing of the gas when made, two modes are adopted: the one by meter or measure ; the other by jet, or burner.

The latter method is open to extensive frauds, and the effects have been severely felt by those companies who have been unable to change the system. The quantity of gas which will flow through the aperture of a given burner, to produce flame of a given height, being ascertained by experiment, and also the aggregate number of hours during a year for which light is required, a contract between the parties is made, and the jet furnished.

If the consumers would all adhere to their contract, and if the pressure in all parts of the town was uniform, no difficulty would arise ; but whenever a customer raises the flame higher than his contract admits, or burns more hours than his agreement, he not only defrauds the manufacturer, but injures all customers who do not take such advantages ; because, the manufacturer, to obtain the cost of his gas and his profit, must enhance the nominal price per thousand, requiring the honest customer to pay the same as he who consumes twice as much as he is entitled to ; the correct customer is therefore paying for light surreptitiously obtained by his neighbour.

The evils of this system are so severely felt, that some companies do not receive more than one half the value of their gas, taken at its sale price, which they are obliged to keep up, to the cost and disadvantage of the honest consumers.

To avoid this evil, an ingenious mode of measuring gas was contrived in the early stages of the art ; which, though liable to some objections, has been gradually improved, until, at this time, all difficulties are, in the main, obviated. This instrument is called the gas-meter ; and consists of a hollow metal drum, revolving in an air-tight case, filled to a certain point with water ; this drum is divided into four compartments, each having two openings, one for the exit, the other for the entrance of the gas. As the drum revolves, one division fills with gas as the opening ascends out of the water ; while, at the same moment, the opposite division descends, and gas is forced, by the water, out of the opening to the burner.

The cubic contents of each division being accurately measured, it is clear that the quantity of gas contained in the drum,

and which passes out during one revolution, must be known. This revolving drum acts upon wheel-work, attached to indicators, which point, on a watch dial, the number of revolutions, and of course, the number of cubic feet that have passed through the meter during the time it has been operating.

The meters are usually examined every three months, and the gas used during that time ascertained. The more completely to exemplify the action of this instrument, I have obtained, through the politeness of Mr. Crosley, the maker, a model in glass, which is now on its way from London; by an examination of this model, its construction will be more perfectly understood.

It will be seen that the accuracy of this measurement depends upon the position of the water-line, which must be kept at a uniform height. From want of attention to this circumstance, errors will occur; but the internal arrangements are such, that an error cannot extend far without discovery, in no case exceeding five per cent., and that in favour of the consumer.

The greatest obstacle to the success of the meters, has been the decomposition of the material composing the internal drum, by the action of the gas, or some of its impurities, while stationary. I have seen meter drums, made of sheet-tin, corroded into holes in five years; which, until discovered, recorded false measurements.

After countless experiments, Messrs. Crosleys of London, have discovered an alloy, which is not acted upon by any product evolved from coal, and the use of this composition appears to render the meter an instrument of such accuracy, that it may be depended upon, and should be universally adopted.

Another instrument has been invented in this country, called a dry meter, because it is used without water, which would be an advantage, all other things being equal. This instrument I have not seen, and of course can give no opinion as to its merits.

The price at which gas is sold, in Great Britain, varies rather with the amount of competition and cost of production, than with any reference to the expense of lighting by other means.

The gas companies appear to be in far greater dread of rival establishments, than from oil or candles. Indeed the latter does not, at this late period, give them a moment's thought ; for so many advantages are found to accrue from the use of gas, in all situations where fixed lights are admissible, that little impression would be made on the sale of it, even if the price of other light were reduced below that of gas.

In Scotland, where greater attention has been paid to the quality of the gas, it is now the usual light in private houses, as well as in more public situations. The best houses in Edinburgh are thus served, and the consumption of gas is fast increasing.

The extension of gas-lights in private houses, is not so much the result of its cheapness as a material for lighting, but on account of its cleanliness, its safety, and saving of labour ; and contrivances are constantly being made to obviate the inconvenience of having stationary lights, the only obstacle to its universal introduction.

In England, it has heretofore been confined in the main, to public streets and buildings, shops, churches, &c.; but its use, in private houses has begun to spread rapidly, as more care is taken in the purification. In London especially, its introduction into private houses has been very limited, for the companies have rather retarded than urged its adoption, finding more profitable consumers elsewhere, who kept pace with their means of supply.

Within a short period, the price of gas has been very materially reduced, varying now from eight to twelve shillings per thousand feet, with a scale of discounts for large consumers by meter, proportioned to the quantity used in the year.

To compare the cost of lighting by gas and oil might be difficult, upon satisfactory data, because the comparisons at the works there, have been made universally with candles. The fine sperm oil of our market, is comparatively little used in England and sells by retail at from 6s. to 6s. 6d. the gallon. For public lighting, (where gas cannot be had,) Greenland, or other common oils are used, which sell by wholesale at 1s. 9d. to 2s. 3d. per gallon, or an average of fifty cents. This is the imperial gallon, which contains one-fifth more than the wine

gallon used here for the same measures. This oil retails at 2s. 6d. to 2s. 9d. per gallon, and is used for common purpose of lighting. The greater consumption, (exempting gas,) is in candles of various kinds.

In my endeavours to procure a comparison between the cost of lighting by the two systems, I was fortunate in procuring such a statement as may be considered satisfactory, inasmuch as it is the result of a series of experiments made to show the difference between the illuminating power of gas, made in different parts of England, referring each to a candle as the standard of comparison. The result being given during the last summer, in evidence before a committee of parliament, on the application of an oil-gas company to change their works for the manufacture of coal gas.

This statement may therefore be taken as authentic, and referred to our own case.

The results being an average of the quantity of gas made in ten manufactories, which by comparison of shadows was found to be equivalent to one hundred pounds of mould tallow candles, (burned clear,) of six to the pound, nine inches long, was twenty-four hundred and seventy-seven feet.

Say 2477 at \$3 per thousand, (here,) - - -	7 43
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One hundred pounds of candles, at \$10 50, cost	10 50
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Difference in favour of gas, - - -	\$ 3 07
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or near thirty per cent. This is the saving, under the supposition that the candle is all consumed or made available, and always gives the same clear light.

The prices here stated are the retail prices ; but it must be remembered that the gas is measured out to the consumer, and burned as fast as it is measured ; consequently, he receives the benefit of all that he pays for, leaving the loss to fall upon the manufacturer, of all leakage between the works and place of consumption ; while, on the contrary, the loss and waste incident to the consumption of candles, fall upon the consumer, and cannot be estimated at less than fifteen per cent.

Again, during all the period of burning gas, a clear, undiminished light is produced, while any light having a solid material for a wick, must diminish in brilliancy the longer it continues to burn.

Taking into view all circumstances, it must be admitted that the use of gas possesses advantages which can belong to no other means of illumination.

It may here be proper to give some general idea of the amount of capital required to carry into execution the works as here described, which, for reasons already given, must be mere approximations :

The works, as before stated, will not exceed	\$35,000
Considering for the moment, that the works will be located on the Schuylkill, north of the Permanent Bridge, and that the leading main will be divided in two, having the aggregate capacity of a main of 15 inches diameter, one now laid will cost	20,000
Pipes for distribution, in all, five miles, say 3 miles, of 6 inch, at \$3.25 per yard, - - -	11,444
Three miles of 3 inch, at \$1.80 per yard, - -	9,504
	\$ 75,948

If to this sum be added the expense incident to walling, leveling, and wharfing the lot, construction of public lamp posts and lamps, with a floating capital necessary to keep up the supply of gas, we may consider that a capital of one hundred thousand dollars is quite ample for the works, as here described. As this sum will include the expenses incurred by enclosing the property, laying one half the great main, and a considerable proportion of the larger pipes of distribution, we may safely conclude, that the second division of the works will not cost more than two-thirds this amount.

In conclusion, I beg leave to suggest, as the result of my examinations on this subject :—

First,—That all information which has come into my possession, either in Europe or in this country, has tended to confirm the opinion that the proposed system of lighting by “Gas” will be found preferable to any other, as regards economy, safety, and convenience.

Second,—That a “gas” manufactory judiciously constructed, and managed with skill and economy, cannot fail to return a handsome profit to its constructors.

Third,—That the art of gas-making has so far advanced at this day, as to place within our reach, such information as will enable this city to entertain the measure with a feeling of perfect security as to the result.

Fourth,—That the objections to the measure, and fears expressed by many valued citizens on a former occasion, are either totally groundless, or very easily obviated, and that the effects which will be produced by a judicious execution of the measure, will be beneficial, both in a moral and pecuniary point of view.

Fifth,—That the improvements made within a few years, render it an easy task so to construct the works as to avoid all danger from explosions, or inconvenience from the offensive nature of the process, or residual matter connected with the manufacture of gas.

Sixth,—That the works be constructed upon a moderate scale, commensurate with the immediate wants of the city, and made complete ; but that land sufficient for the increase of the works should be appropriated for their extension, to satisfy the demand in all parts of the city, and that the mains or pipes be laid of such capacity as to insure their aptitude for any future demand.

All which is respectfully submitted.

S. V. MERRICK.

December 11, 1834.

REPORT

OF THE

COMMITTEE ON LIGHTING AND WATCHING.

DECEMBER 26, 1834.

The Committee on Lighting and Watching, to whom was referred the item of unfinished business in relation to lighting the city with gas, present the following as their final Report on that subject :

REPORT.

THE Committee have not been able, after all their inquiries and reflections on this subject, to arrive at any other conclusion than that contained in the reports of all former committees that have been charged by Councils with the consideration of this subject : viz. *That it is expedient for Councils to introduce this mode of lighting the city.*

If any thing could be necessary, in addition to the facts formerly reported to Councils on this subject, to satisfy the minds of the timid and sceptical, abundance is found in the able report of the agent lately returned from Europe. So universal is the practice of lighting by Gas becoming on the continent of Europe, but more particularly in England and Scotland, that not only are the large cities, but many of the villages, and even some of the turnpike roads, illuminated by this means. And in our own country, nearly all the principal cities are pursuing the same course.

Philadelphia, confessedly the best adapted, having every pos-

sible advantage that nature and art could confer for the purpose—and owning too all the materials for its manufacture—she, who possessed every inducement to take *the lead* in this great modern improvement, doubts and fears even *to follow* her sister cities.

Believing, as the committee do, that Councils can not longer hesitate on this subject, they now present an ordinance for the erection of Gas Works to light the city, to be constructed on a limited and economical plan, embracing the most modern improvements in the art.

R. M. HUSTON,
JOSHUA LIPPINCOTT,
JOHN P. WETHERILL,
JAMES ROWLAND,
B. H. YARNALL,
MANUEL EYRE.

Philadelphia, December 26th, 1834.

IN COMMON COUNCIL, }
FEBRUARY 12, 1835. }

RESOLVED, That the petitions of sundry citizens on the subject of lighting the city with gas, be referred to a joint special committee of four members of each council, with instructions to report a bill, if they shall deem the introduction of gas expedient, which shall effectually guard the city from any increase of taxation, and from any eventual loss by adopting the project ; and also to ascertain on what terms gas can be obtained from any private company sufficient to light a certain number of public lamps within the city limits, in order that the expense, the advantages, and the inconveniences of the measure may be fully and accurately known.

Common Council appointed Messrs. FRALEY, WILLIAMS, HUSTON and LANCASTER.

Select Council concurred, and appointed Messrs. KEATING, PRICE, WIEGAND, and LIPPINCOTT.

From the minutes.

R. HARE, JR.
Clerk C. C.

IN COMMON COUNCIL, }
FEBRUARY 20, 1835. }

ORDERED, That the committee on lighting the city with gas, be instructed to ascertain as far as practicable, and report to councils at the next meeting, how many of the signers of the various memorials presented to councils are minors or non-residents of the city.

From the minutes.

R. HARE, JR.
Clerk C. C.

REPORT.

MARCH 9th, 1835.

THE joint special committee to whom were referred the petitions of sundry citizens, on the subject of lighting the city with gas under the annexed resolutions,

Respectfully Report,

That they have given the subject that attention which its interesting character and importance demand, and now present the conclusions to which they have arrived, after a careful examination of the question.

The resolutions under which they act, may be considered as presenting three points for investigation ; and for the sake of clearness will be thus divided and treated of in order.

The first of them, is the expediency of introducing gas lighting into the city of Philadelphia at the present time. Numerous petitions have been presented to councils for several years, urging the introduction of gas, for the purpose of public and private illumination ; and in the year 1834, the expediency of the measure having been determined by a very strong expression of the public will, a competent agent was appointed to proceed to Europe, for the purpose of ascertaining the best construction for gas works, the most approved process for its manufacture, and generally to make such observations as may be useful in the event of Councils determining to adopt a plan for lighting the city with gas. The report of the agent has been before the public for some time, and in the opinion of the committee is in full accordance with the spirit of the resolution under which he was appointed. We refer to it as con-

taining a very clear exposition of the whole subject of manufacturing gas, and regret that the omission to include in it any estimate of the *cost* of manufacturing the article has been deemed to be an exception to its accuracy. On this head the committee ask leave to observe, that a large mass of information on this branch of the subject has been obtained by Mr. Merrick, under a pledge that it should not be given to the public through the medium of the press; but used only to satisfy gentlemen connected with the corporation to whom the ultimate decision of the matter was to be referred. These details of the working operations of the large establishments of Great Britain have been freely put into the hands of the committee; and we deem it an act of simple justice to Mr. Merrick, to state that he has considered them as entirely open to the inspection of any member of Council, under the limitations on which he himself received them. From the information thus put in our possession and acquired from other sources, we have been irresistibly led to the conclusion, that it is expedient to introduce gas lighting into the city. We now proceed to show on what ground this conviction rests; and fully recognizing the principle that no injurious publication of the affairs of the companies who have submitted their books for inspection should be made, shall withhold so much of the information received from Mr. Merrick as has not hitherto been presented to the public in other forms. Premising that the cost of manufacturing gas depends in an almost direct proportion on the quantity produced and used, we shall submit an estimate resting partly on the testimony taken on several occasions by committees of the British House of Commons, and on the well authenticated statements of the cost of erecting gas works, &c. to be found in numerous publications.

On the authority of these statements, and making due allowance for the difference in the price of materials and labour in this country when compared with England, we believe that gas works, competent to produce 75,000 cubic feet of gas daily, may be erected, and the necessary mains and pipes for

distribution to the extent of eight miles, be laid by an expenditure of \$76,000

That the floating capital necessary to carry on the works and cover incidental charges in their construction, would be 24,000

Making a total of \$100,000

To produce an available quantity of 75,000 cubic feet of gas daily, there will be required 4380 tons of coal annually, for carbonization and fuel, which, at six dollars per ton,

would be \$26,280 00

4380 bushels of lime for purification at 25 cts, 1,095 00

16 men for attending retorts, \$30 per month, 5,760 00

4 labourers for incidental services, \$25 per month, 1,200 00

Wear and tear of Works, 5 p. c. 5000 00

Salaries of superintendent and clerk, taxes and incidentals, 5000 00

Making the cost of 27,375,000 cubic feet per annum, \$44,335 00

or about one dollar and sixty cents per thousand cubic feet, exclusive of the interest on the capital invested in the works. In this estimate, no deduction from the cost of manufacturing has been made on account of the coke and other products obtained during the process, for which it is believed a ready and profitable market exists in the city.

The sale of these products would essentially lessen the cost of production ; but as the above estimate is made on the supposition that the whole quantity of gas which the works are competent to produce would be sold, it is deemed more safe to omit them in giving results which are liable to be affected by the variable consumption of gas during the summer months, as in some degree compensating for the permanent charges which always remain stationary, and increase the cost of producing a diminished quantity of gas.

Deducing the comparative cost of lighting with gas instead of oil from the elements thus furnished, it appears that by the

consumption of four cubic feet of gas per hour (a quantity stated by good authority to be equal to an Argand oil lamp of the usual size) for five hours, the quantity consumed would be 20 feet, which at \$3 00 per thousand feet, gives the cost of such a light per annum \$21 90 ; the cost of an Argand oil lamp consuming $\frac{3}{4}$ of a pint of oil during the same time would be for 28 gallons at \$1 per gallon \$28. Adopting one dollar and fifty cents per thousand cubic feet as the price at which it is proposed to furnish the public lamps, it appears from a statement obtained from the city clerk, that during the year 1834, 25,438 gallons of oil were furnished to the public lamps, and that the quantities consumed were estimated to be respectively $8\frac{1}{2}$ gallons for the common, and 25 gallons for each Argand lamp. To obtain a light of the same intensity by the aid of gas would require,

For 183 Argand lamps, at 8544 cubic feet each per annum,	\$2346 00
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For 2513 common lamps, at 2136 cubic feet each per annum,	8051 00
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Making together	\$10,397 00
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The present cost, at 78 cents per gallon for oil, is \$19,841 64 and does not include waste by leakage, &c., which is estimated by the contractor for supplying the city with oil (in a recent publication,) at about 10 p. c. more.

Having fully satisfied ourselves of the expediency of introducing gas lighting, we proceed to the second point of the resolution, which is to prepare a bill that shall effectually guard the city from any increase of taxation or from any eventual loss by adopting the project. In the ordinance herewith submitted we have endeavoured to present a plan embracing both the object of the resolution and what may be considered as not only the wishes of the petitioners, but also of the remonstrants; namely, that the experiment shall not be tried at the expense of the city. The first and second sections of the ordinance authorize a subscription for raising a sufficient sum of money for the construction and carrying on of works com-

petent to manufacture 75,000 cubic feet of gas daily, and provide that as a compensation to the subscribers, they shall be entitled to the profits of the establishment, without looking to the city treasury for any other remuneration in case the project does not succeed, and reserve to the city the right at any time to take possession of the works, and fund the stock at an interest of six per cent. per annum. The third, fourth and fifth sections provide for the election of a board of trustees, to whom the management of the works is to be confided, define their duties and contain the necessary provisions for securing a supply of gas to private consumers at a price to be approved by councils, and the lighting of public lamps on such terms as will compensate for the advantages given to the subscribers by the ordinance.

The sixth section directs all moneys, received or paid on account of the works, to be accounted for at the city treasury, under the usual restrictions ; and the seventh section authorizes the construction of the works on the ground owned by the corporation north of the Permanent Bridge on the Schuylkill, at a fixed rent ; with the right to the city to reclaim so much thereof at any time after the year 1840 as may, in the opinion of the trustees, not be necessary for the accommodation of the proposed works. This ordinance, it is believed, will not only guard the city from any increase of taxation ; but will insure the construction of works of sufficient extent to present the subject intelligibly to our citizens.

No loss can be sustained by the city in the event of a failure of the project ; and the guardianship and control of the establishment being completely vested in the corporation, every thing connected with the public interest is effectually secured.

The third part of the resolution directs an inquiry into the terms on which a private company would furnish gas sufficient to light a certain number of public lamps ; in order that the expense, the advantages and the inconvenience of the measure may be fully known. On this point the committee beg leave to state that there is at present no establishment for manufacturing gas, of the kind proposed, in operation in the city of Philadelphia.

The small works belonging to the Grand Lodge of Pennsylv-

vania are arranged for the manufacture of gas from rosin, and are not of sufficient capacity for the purpose, and even in the event of our ability to make a satisfactory contract with them, no results applicable to the manufacture of gas from coal could be obtained, having a bearing on the question, either as regards the expense, the advantages or the inconvenience of the plan submitted. An application has however been made to the Grand Lodge, to which they have made the following reply : "That they could supply the city with from 10 to 12,000 cubic feet of gas every 24 hours at about one and a half cents per foot, and it would be indispensable that the city should provide a gasometer, to receive the article as manufactured."

The committee are of the opinion, that as the experience of upwards of twenty years in Europe, has fully established the superiority of coal gas over every other means of illumination, it would be unwise to resort to a plan not only known to be comparatively unprofitable, but also creating a dependence on other states for a supply of the crude materials, when by adopting one sanctioned by an enlarged experience, we should foster one of the most valuable branches of our domestic industry, and draw our supplies entirely from the bosom of our own commonwealth.

The resolution of the 26th ultimo, directs the committee to inquire as far as practicable and report what proportion of the signers of the several memorials are minors, or non-residents of the city. On the first point, the committee are not able to arrive at any result that would be satisfactory ; inasmuch as records, entirely beyond their control, would be required to establish or deny the fulness of age of many of the signers : and it is therefore dismissed from our consideration. On the second point, namely, the non-residence of signers, it appears that the signatures of owners of real estate in the city have been obtained both to the petitions and remonstrances ; and the question of residence in such cases does not appear to us to be material. It may sufficiently answer the object of this resolution to state, that about the same proportion of signers known to the committee, is to be found on both classes of the memorials. In order that councils may have all the information before them, we lay the several memorials on the table, merely stating, in passing, that

the petitions are signed by about 4000 persons, and the remonstrances by about 725. We deem it due to the gentlemen of both parties who have been instrumental in bringing the subject before us to state, that no fraud appears to have been practised or intended by either party.

In conclusion, the committee having, to the best of their ability, performed the duties confided to them, earnestly recommend the passage of the ordinance submitted with this report, under the conviction that the public mind is fully prepared to give it a favourable trial; and that the advantages which gas presents in point of economy and safety, will gradually bring it into such general use, that the city may, in a few years, take possession of the works, and enlarge their capacity to an extent that will furnish a cheap and brilliant light for all public and many private purposes.

FREDERICK FRALEY,
W. H. KEATING.
JOS. LIPPINCOTT,
JOHN WIEGAND,
RICHARD PRICE,
R. M. HUSTON,

Committee.

Philadelphia, March 9th, 1835.

REPORT

OF THE COMMITTEE ON POLICE ON GAS ORDINANCE.

SEPTEMBER 8th, 1836.

THE Committee on Police, to whom was committed the Bill, entitled "Supplement to an Ordinance, entitled 'An ordinance for the construction and management of the Philadelphia Gas Works,'" and the amendment offered thereto, report—

That they have considered the matter referred to them, and recommend the passage of the first and third sections of the said Bill. The second section, however, and the amendment offered to it, are liable to objection.

By the fifth section of the Ordinance establishing the Gas Works, the Trustees are bound to provide three hundred public lamps, without expense to the City Corporation, and to supply the same with gas, at half the price paid by private consumers. The Trustees have provided about one half the public lamps that may be required of them; the residue not having been called for by the Committee on Police. The second section of the Bill proposes to release the Trustees from the obligation to furnish the balance of the three hundred public lamps, and the amendment offered provides, that the Trustees shall be re-imbursed the expense already incurred in the erection of public lamps. As a compensation to the City for these remissions, the amendment provides, that the Trustees shall extend the gas pipes so as to light the public squares. The Committee has always been of opinion that the public lamps which the Trustees were bound to provide, became the property of the City as soon as they were erected. The Trustees, it seems, entertain a different opinion. It is a question, however, of no practical importance, as the City is undoubtedly entitled to the full and perpetual use of them, and her interest in them is therefore as valuable, as if she had an absolute property in

them. The Committee understand, that the lamps cost about twenty-five dollars a piece, so that if the second section of the Bill, and the amendment to it, should pass, the City would remit to the Gas Works about \$7,500. The extension of the gas pipes, so as to light Independence and Washington Squares, would cost, it is supposed, between two and three thousand dollars. It is evident, therefore, that the inducement offered for the passage of the second section, and the amendment, is entirely inadequate. The stockholders in the Gas Works subscribed or purchased their stock, with a full knowledge of the bonus to which the City is entitled under the fifth section of the original Ordinance, and the Committee is of opinion that they should be held to their bargain. The Committee therefore recommends, that the second section of the Bill, and the amendment, be negatived, and that the following section be inserted in lieu thereof.

SECTION 2. That three hundred public lamps, in addition to those mentioned in the fifth section of the Ordinance to which this is a supplement, shall be supplied with gas at one half the price paid by private consumers, the fixtures and meters therefor to be provided by the City, provided that the price paid for gas supplied to said lamps, shall not exceed the rate of one dollar and seventy-five cents for one thousand cubic feet, and that the said lamps shall be erected under the direction of the Committee on Police, or as may be hereafter provided by Councils.

**WILLIAM T. SMITH,
BENJAMIN M. HINCHMAN,
HENRY SAILOR,
JOHN WIEGAND,
CORNELIUS S. SMITH.**

ORDINANCES
FOR THE CONSTRUCTION AND MANAGEMENT
OF THE
PHILADELPHIA GAS WORKS.

The Commission on the Status of Women
has been established by the United Nations
to study the position of women in all countries
and to make recommendations for their improvement.
The Commission was set up in 1946 and has since
that time held several sessions. It has held
its first session in 1946, its second in 1948,
its third in 1950, its fourth in 1952, its fifth
in 1954, its sixth in 1956, its seventh in 1958,
its eighth in 1960, its ninth in 1962, its tenth
in 1964, its eleventh in 1966, its twelfth in 1968,
its thirteenth in 1970, its fourteenth in 1972,
its fifteenth in 1974, its sixteenth in 1976,
its seventeenth in 1978, its eighteenth in 1980,
its nineteenth in 1982, its twentieth in 1984,
its twenty-first in 1986, its twenty-second in 1988,
its twenty-third in 1990, its twenty-fourth in 1992,
its twenty-fifth in 1994, its twenty-sixth in 1996,
its twenty-seventh in 1998, its twenty-eighth in 2000,
its twenty-ninth in 2002, its thirtieth in 2004,
its thirty-first in 2006, its thirty-second in 2008,
its thirty-third in 2010, its thirty-fourth in 2012,
its thirty-fifth in 2014, its thirty-sixth in 2016,
its thirty-seventh in 2018, its thirty-eighth in 2020,
its thirty-ninth in 2022, its fortieth in 2024.

The Commission has held its sessions in various
locations, including New York, Geneva, and
Vienna. It has also held regional meetings
in Africa, Asia, Europe, Latin America,
and the Middle East.

ORDINARY

The Commission has also held a series of
workshops and seminars on various topics
related to the status of women, including
the role of women in development, the
status of women in the workplace, and
the status of women in the family.

The Commission has also been instrumental
in the development of the Convention on
the Elimination of All Forms of Discrimination
Against Women (CEDAW), which was adopted
by the United Nations General Assembly in
1979.

PHILADELPHIA GAS WORKS

The Commission has also been instrumental
in the development of the Convention on
the Rights of the Child (CRC), which was
adopted by the United Nations General
Assembly in 1989.

The Commission has also been instrumental
in the development of the Convention on
the Rights of Persons with Disabilities (CRPD),
which was adopted by the United Nations
General Assembly in 2006.

The Commission has also been instrumental
in the development of the Convention on
the Rights of Indigenous Peoples (CIP), which
was adopted by the United Nations General
Assembly in 2007.

The Commission has also been instrumental
in the development of the Convention on
the Rights of Migrant Workers and their
Families (CMW), which was adopted by the
United Nations General Assembly in 2003.

The Commission has also been instrumental
in the development of the Convention on
the Rights of the Girl Child (CGC), which
was adopted by the United Nations General
Assembly in 2005.

The Commission has also been instrumental
in the development of the Convention on
the Rights of the Adolescent Girl (CAG),
which was adopted by the United Nations
General Assembly in 2007.

The Commission has also been instrumental
in the development of the Convention on
the Rights of the Adolescent Boy (CAB),
which was adopted by the United Nations
General Assembly in 2009.

AN

ORDINANCE

FOR THE CONSTRUCTION AND MANAGEMENT

OF THE

PHILADELPHIA GAS WORKS.

SECTION 1. *Be it ordained and enacted by the citizens of Philadelphia in Select and Common Councils assembled,* That for the construction and carrying on the works hereinafter provided for, the sum of one hundred thousand dollars, to be divided into one thousand shares of one hundred dollars each, shall be raised in the following manner. A book shall be opened by the city treasurer, at such convenient place as he may designate, on the first Monday of April, 1835, and be kept open during the office hours of said treasurer for six juridical days thereafter, in which the said treasurer shall permit all persons of lawful age, either personally or by attorney duly authorized, to subscribe for any number of shares of the said stock on the following conditions :

The said book shall be headed in the following manner :— We, whose names are hereunto subscribed, promise to pay to the city treasurer the sum of one hundred dollars for each share of stock set opposite to our respective names, on the days and times and in such quotas and proportions as may be fixed by the trustees appointed according to the provisions of an ordinance entitled an ordinance for the construction and management of the PHILADELPHIA GAS WORKS, passed the — day of — 1835. The said subscribers shall pay to the city treasurer at the time of subscribing, ten dollars on each share, and the remaining ninety dollars on each share at such times and in such proportions as shall be required by the Trustees here-

inafter provided for. *Provided*, that if such subscriptions shall exceed the full number of one thousand shares, they shall be divided amongst the subscribers pro rata, according to their subscriptions, but not less than one share shall be allotted to any subscriber ; and, *Provided further*, that the said Trustees shall have authority, on the application of a majority of the stockholders voting according to their respective interests and with the consent of the Select and Common Council, to borrow any sum not exceeding 25,000 dollars, or to receive subscriptions for any additional number of shares not exceeding two hundred and fifty in the whole, if the same shall be found necessary to complete the works and put them in operation.

SEC. 2. *Be it further ordained and enacted by the authority aforesaid*, That when the said subscriptions are completed, and the payments made in full on each share, certificates to be signed by the mayor of the city, and countersigned by the city treasurer, transferable in like manner with the certificates of the funded debt of the city, shall be issued in the following form :—

Philadelphia,

1835.

This is to certify, that _____ is the owner of _____ shares of the stock created by an ordinance, passed the _____ day of _____ 1835, for the construction and management of the Philadelphia Gas Works, for which _____ entitled to the pro rata proportion of the profit arising from said works, to be declared according to the provisions of the fourth section of said ordinance ; subject, nevertheless, to the right of the mayor, aldermen, and citizens of Philadelphia, at any time the Select and Common Council may deem it expedient to take possession of said works and convert the said stock into a loan, redeemable in twenty years from the date of such conversion, bearing an interest of six per cent. per annum, payable half yearly on the first days of February and August. *Provided*, that the said mayor, aldermen, and citizens of Philadelphia, are not to be responsible to the holder of this certificate prior to such conversion, for the payment of any money on account of said works, other than his, her, or their

proportion of the profits declared as aforesaid, and actually paid into the city treasury.

SEC. 3. *And be it further ordained and enacted by the authority aforesaid,* That within ten days after the passage of this ordinance, the Select and Common Council shall choose by ballot twelve citizens of Philadelphia, who shall be denominated Trustees of the Philadelphia Gas Works, six of said Trustees to be elected by the Select Council, and six to be elected by the Common Council. As soon as said elections are completed, the clerks of Councils, respectively, shall divide the persons so chosen by lot into three classes: the first class to serve one year, the second class to serve two years, and the third class to serve three years, or until their successors shall have been appointed, and record the result upon the minutes of Council.

And annually thereafter at the last stated meeting in January, the Select and Common Council shall each, respectively, elect two citizens of Philadelphia to serve as Trustees for the term of three years, in the place of those whose term of service shall have expired. Not more than two members of each Council shall be Trustees at any time, and any vacancies that may occur, shall be filled by special elections to be held by the body, in whose delegation in the board of Trustees the vacancy may exist. The said Trustees, seven of whom shall be a quorum for the transaction of business, shall meet within ten days after their election, and choose out of their own body a President, and the election of President shall take place in each succeeding year at the meeting next after the election of Trustees.

SEC. 4. *And be it further ordained and enacted by the authority aforesaid,* That it shall be the duty of the Trustees so appointed, to proceed forthwith to construct suitable works for the manufacture of carburetted hydrogen gas from bituminous coal, for the purpose of public and private illumination, and to lay pipes for its distribution through the city. The said works shall be on a scale competent to manufacture 75,000 cubic feet of gas daily, and the arrangement of the pipes for distribution and delivery shall be approved by the Watering Committee. The said Trustees shall keep accurate

accounts of their receipts and disbursements ; and report the same, together with a statement of their proceedings, to Councils, annually, in the month of January, and give such other information as may, from time to time, be required by the Select or Common Council. They shall, semi-annually on the first days of February and August, declare a dividend of the profits arising from the manufacture and sale of gas ; after deducting the rent of the lot, the expense of manufacturing the gas, the cost of repairs to the works, and the incidental charges of the establishment : and issue a requisition on the mayor for the payment of said dividends to the holders of the certificates.

SEC. 5. *And be it further ordained and enacted by the authority aforesaid,* That the Trustees aforesaid be and they are hereby vested with powers necessary for the construction of the works herein provided for ; and for the purpose of carrying into effect the intents of this ordinance, are hereby empowered to purchase materials, make contracts, and employ such agent or agents as they may deem necessary : *Provided,* that no contract shall be entered into, or expenses incurred, to exceed the amount of the subscriptions for the construction of the works: That no Trustee, superintendent, or agent of the Philadelphia Gas Works, shall be either directly or indirectly concerned or interested in any contract or engagement for doing work or labour, or furnishing or providing materials, under the provisions of this ordinance; nor shall any act of said Trustees impose any liability whatever on the Mayor, Aldermen, and Citizens of Philadelphia, beyond the amount of the said subscriptions. The said Trustees shall, from time to time, prepare and submit to Councils for their approbation, rules and regulations under which the gas may be furnished to private consumers and to the public lamps: *Provided,* that as many public lamps, not exceeding three hundred in the whole, as may be required by the committee on Lighting and Watching, shall be supplied at one half the price paid by private consumers; the fixtures and meters therefor, to be approved of by the last named committee, being provided by the Trustees without expense to the City Corporation.

SEC. 6. *And be it further ordained and enacted by the authority aforesaid,* That all moneys arising from the manu-

facture and sale of gas, shall be paid into the city treasury; and be placed to the credit of the Philadelphia Gas Works; and that the Mayor of the city be, and he is hereby authorized to draw warrants, which shall be charged to the said Works, for such sums and at such times as may be required by the Trustees aforesaid, for the fulfilment of this ordinance. *Provided*, that all requisitions for money shall have been duly authorized by the Board of Trustees and certified by the President.

SEC. 7. *And be it further ordained and enacted by the authority aforesaid*, That the ground owned by the corporation of Philadelphia, bounded east by Front street, north by Filbert street, south by High street, and west by the river Schuylkill, be, and is hereby appropriated for the location and use of the Gas Works aforesaid, for which a rent of five hundred dollars per annum shall be charged to the works: *Provided*, that the Select and Common Councils may, at any time, reclaim so much of said lot as may in the opinion of the Trustees aforesaid, not be necessary for the accommodation of the works herein provided for.

Enacted into an ordinance at the City of Philadelphia,
this 21st day of March, in the year of our Lord one
thousand eight hundred and thirty-five.

HENRY TROTH,
President of the Common Council.

WM. M. MEREDITH,
President of the Select Council.

Attest—ROBERT HARE, Jr.
Clerk of the Common Council.

After the passage of the above ordinance, Councils resolved to elect the first Board of Trustees, on the evening of the 28th of March, 1835.

MARCH 28, 1836.

Select and Common Councils, each separately, in the course of the evening, went into an election for Trustees of the Philadelphia Gas Works. The following named gentlemen were chosen :—

By Select Council.

BENJ. W. RICHARDS,	}	For 1 year.
J. R. LATIMER,		
A. D. BACHE,	}	For 2 years.
WM. H. KEATING,		
J. P. WETHERILL,	}	For 3 years.
H. M. ZOLLICKOFFER,		

By Common Council.

JOHN FARR,	}	For 1 year.
DR. R. M. HUSTON,		
FRED. FRALEY,	}	For 2 years.
EPHRAIM HAINES,		
M. W. BALDWIN,	}	For 3 years.
THOMAS CAVE,		

AN ORDINANCE

FOR THE DISTRIBUTION OF THE STOCK OF THE PHILADELPHIA
GAS WORKS.

Be it ordained and enacted by the citizens of Philadelphia, in Select and Common Councils assembled, That in case the number of subscribers to the stock of the Philadelphia Gas Works shall exceed one thousand persons, it shall be the duty of the city treasurer to divide the stock amongst them by lot, immediately after the closing of the subscription book, agreeably to the notice given by the city treasurer.

Enacted into an ordinance at the city of Philadelphia, this 6th day of April, in the year of our Lord one thousand eight hundred and thirty-five.

A SUPPLEMENT

TO AN ORDINANCE FOR THE CONSTRUCTION AND MANAGEMENT
OF THE PHILADELPHIA GAS WORKS.

Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled, That the city treasurer be, and he is hereby authorized to permit transfers of the stock of the Philadelphia Gas Works to be made, prior to the payments in full on each share, under such regulations as he may think proper; any thing in the second section of the ordinance to which this is a supplement to the contrary notwithstanding.

Enacted into an ordinance at the City of Philadelphia, this 30th day of April, in the year of our Lord one thousand eight hundred and thirty-five.

EXTRACT

FROM THE JOURNAL OF THE SELECT COUNCIL.

OCTOBER 1, 1835.

The President laid before Council a communication from the Trustees of the Philadelphia Gas Works, transmitting the rules and terms upon which the public will be supplied with gas—which was read.

Mr. Keating offered the following :

Resolved, That the Select and Common Councils approve of the rules and regulations submitted by the Trustees of the Gas Works for the sale and distribution of Gas to private consumers, and to the public lamps, which was read and laid on the table.

Oct. 8th, 1835. Resolution was passed.

Common Council concurred.

TERMS

UPON WHICH THE PUBLIC WILL BE SUPPLIED WITH
GAS BY THE TRUSTEES OF THE PHILADELPHIA GAS
WORKS.

1. All applications for a supply of Gas must be made in person at the office of the Trustees ; the applicant signing the regulations, and stating the probable number of burners that he may require.

2. Gas will be supplied by the meter, or by special contract in writing, and should the meters be found defective, they will be immediately changed. And in case of their ceasing to register the quantity of Gas consumed, the account will be made by the average of another meter, or by the amount charged during a previous corresponding period.

3. The Trustees may, whenever they shall deem it expedient, require security for the payment of the Gas expected to be consumed, or the deposit of a sum in advance, to secure themselves against loss.

4. The service pipe from the main to the inside of the building to be lighted, will be laid and the meter furnished by the Trustees, without cost to consumers; except where Gas is contemplated to be used for short periods, or during only a portion of the year. In such instances the service pipe and meter must be paid for by the consumer, or leased from the Trustees, as may be agreed upon between the parties.

5. The tubings and fittings for the conveyance of Gas within the walls, after it has passed the meter, may be put up by any competent mechanic employed by the consumer or proprietor of the premises; subject, however, to the inspection and approval of the Trustees, or their authorized agents.

6. All screws used in putting up Gas-tubing shall be made to such standard sizes as may be authorized by the Trustees, and no tubing shall be used except such as may be now or hereafter allowed by them; and all tubings and fittings shall be examined and approved by an Inspector appointed by the Trustees, previous to being put up; and again examined and approved after being fixed, before Gas will be supplied.

7. The Inspector shall at all times be in readiness to examine the apparatus and premises of applicants, free of charge, on receiving three days notice.

8. The Inspector, unless otherwise ordered by the Trustees, shall introduce the Gas into any premises within the range of the pipes, whenever he shall be satisfied that the fittings are put up in their proper places, in a workmanlike manner, and are perfectly Gas tight.

9. The Trustees shall, at all times, by their Inspector, or other authorized agents, have the right of free access into the premises lighted with Gas, for the purpose of examining the whole Gas apparatus, or for the removal of the meter and service pipe.

10. The tenant of any premises using Gas, shall give at least three days written notice whenever he is about to remove, that the Gas may be stopped, or he will remain liable for any Gas that may pass through the meter until such notice is given.

11. The quantity of Gas consumed will, in all cases, be ascertained in the manner prescribed in the second article of

these rules, and the bills rendered on the first day of March, June, September and December, unless otherwise directed by the Trustees.

12. In default of payment for Gas consumed, within ten days next after the quarter days mentioned in the 11th article, or in case of a leak or injury done to the meter or pipes within the premises of any consumer, the flow of Gas shall be stopped until the bill is paid, or the necessary repairs are made.

13. The price of Gas shall be three dollars and fifty cents per thousand cubic feet, and a discount of five per cent. will be allowed on the amount of all bills paid at the office of the Trustees, within three days after presentation.

14. The Trustees reserve to themselves the right, at any time, to cut off the communication of the service pipe, if they shall find it necessary to do so in order to protect the works against abuse or fraud.

15. Each consumer of Gas shall be furnished with a copy of the foregoing rules, on application at the office of the Trustees.

R. M. HUSTON, *President.*

BENJ. MATTHIAS, *Secretary.*

I certify that the foregoing is a true copy of the rules and terms on which the public will be supplied with Gas by "The Trustees of the Philadelphia Gas Works," which were read in Select Council, October 1st, 1835. And approved by a joint vote of Councils, October 8th, 1835.

J. G. CLARKSON,
Clerk of S. C.

It is advised that consumers be requested to give immediate notice at the Office, if any escape of Gas be discovered, as no deductions will be made from the bills rendered for Gas passing through the meter, &c.

They are also desired to notify the Trustees, as early in the day as possible, of any deficiency of lights, that the evil may be remedied without delay. The Trustees recommend that glasses be used with the argand burners, and that proper attention be given to regulating the *height of the flame*, on which depends the quantity of Gas consumed. By raising the flame to a moderate height, the most perfect combustion and brightest light are obtained; and the use of the Gas is thus

rendered both pleasant and economical, being entirely free from smoke, or the least unpleasant smell. The burners should also be kept free from dust, and if at any time they become obstructed, the application of a brush to the apertures will immediately remove the difficulty.

A SUPPLEMENT

TO THE ORDINANCE ENTITLED AN ORDINANCE FOR THE CONSTRUCTION AND MANAGEMENT OF THE PHILADELPHIA GAS WORKS, PASSED MARCH 21, 1835."

SECTION 1. *Be it ordained and enacted by the Citizens of Philadelphia in Select and Common Councils assembled,* That the Trustees of the Philadelphia Gas Works be, and they are hereby authorized to receive subscriptions for an additional number of shares of stock in the said works, not exceeding two hundred and fifty in the whole, under the following restrictions and conditions, viz:—

1st. The said number of shares shall be raised by the issue of one thousand certificates of quarter shares; the holders of the original shares of stock in the said company being entitled to receive as many quarter shares as may be equivalent to the number of original shares held by each; and if any holder of original shares shall decline or neglect to apply for his quarter shares, such quarter shares shall be sold by the Trustees of the Philadelphia Gas Works at auction, and the nett proceeds of the sale credited to the Works.

2d. The par value of such quarter shares shall be twenty-five dollars, and none shall be sold for less than its par value.

3d. The said quarter shares may at any time be converted into whole shares by the return to the city treasurer of four certificates of quarter shares, upon the receipt and cancelment of which he shall issue to the person returning the same a certificate for one whole share.

4th. The new whole shares created by this ordinance shall be placed on the same footing and entitle the holders thereof to the same rights and privileges as are or may be enjoyed by the holders of original shares under the ordinance to which this is a supplement.

SECTION 2. The Trustees of the Philadelphia Gas Works may adopt such rules and regulations as to the time and mode of disposing of the new stock, as they may deem expedient, provided the same shall not be repugnant to the provisions of the first section of this ordinance.

Enacted into an ordinance at the City of Philadelphia, this 28th day of January, in the year of our Lord one thousand eight hundred and thirty-six.

AN ORDINANCE

FOR THE PROTECTION OF THE PHILADELPHIA GAS WORKS.

Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled, That any person or persons who shall open a communication into the street gas main, or other gas pipe, without authority from the Inspector, or other authorized agent of the Trustees of the Philadelphia Gas Works; or who shall let on the gas after it has been stopped by order of said Inspector, or other authorized agent, for repairs or any other purpose; or who shall put up any pipes or burners in addition to the pipes or burners originally put up and inspected, and introduce the gas into them without authority as aforesaid, shall be subject to a penalty of not less than ten nor more than fifty dollars for each and every such offence; one-half to be paid to the informer, and the other half into the city treasury.

Enacted into an ordinance at the city of Philadelphia, this 6th day of October, in the year of our Lord one thousand eight hundred and thirty-six.

AN ORDINANCE

FOR THE EXTENSION OF THE PHILADELPHIA GAS WORKS.

SECTION 1. *Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled,* That for the purpose of enabling the Trustees of the Philadelphia Gas Works to extend the said works, especially by laying down a greater extent of pipes for the distribution of gas, the Mayor of the city is hereby authorized, on the requisition of the said Trustees, to borrow such sums of money as they may require, not exceeding one hundred and fifty thousand dollars in the whole ; for which certificates of one hundred dollars and upwards, but containing no fractional part of one hundred dollars, shall be issued to the lenders; which certificates shall be transferable only at the office of the Philadelphia Gas Works.

SECTION 2. *And be it further ordained and enacted by the authority aforesaid,* That the said loans shall be redeemable on the first day of January, Anno Domini one thousand eight hundred and sixty-two, and shall bear such rate of interest, not exceeding six per centum per annum, as may be fixed by the said Trustees, payable semi-annually, at the office of the Philadelphia Gas Works, on the first days of January and July. The faith of the city, and the buildings, apparatus, pipes, and fixtures of the said gas works, shall be pledged for the repayment of the said loans, and in order that provision may be made for the payment of the interest accruing on the loans hereby authorized, and for the redemption of the principal thereof, when the same shall fall due, the Trustees are hereby authorized and required to set apart and reserve out of the moneys received by them from the manufacture and sale of gas, the sum of eight per centum per annum on the amount of the certificates issued by virtue of this ordinance, before any dividend of the profits of the said works shall be declared and distributed among the stockholders; which said sum of eight per centum shall be applied in the first place to the payment of the interest accruing on the loans hereby authorized ; and the balance which remains, after providing for the said

interest, shall be invested in some productive stock, other than that of the Philadelphia Gas Works, by the said Trustees, to form, with the interest received thereon, a Sinking Fund for the redemption of the loans hereby authorized; which balances and interest, so forming the said Sinking Fund, shall be kept separate and distinct from the other funds of the said Trustees, who shall furnish to the Select and Common Councils, annually, in the month of January, a statement of the amount thereof, and the stocks wherein the same shall be invested.

SEC. 3. *And be it further ordained and enacted by the authority aforesaid,* That if the said Sinking Fund shall not, at the period when the loans hereby authorized become due and payable, be sufficient to pay off and discharge the same, and the said Trustees shall neglect or be unable to provide other funds for that purpose, so that the Mayor, Aldermen, and Citizens of Philadelphia shall be obliged to make up from their own resources any deficiencies which may thereby occur; then said Trustees shall, annually, on the first day of July, before declaring any dividend of profits, pay over to the city treasurer eight per centum on the amount of certificates issued by virtue hereof, until the Mayor, Aldermen, and Citizens of Philadelphia shall be fully and entirely reimbursed for all sums of money, whether of principal or of interest, paid by them on account of the said certificates of loan, with interest thereon at the rate of five per centum per annum.

SEC. 4. *And be it further ordained and enacted by the authority aforesaid,* That three hundred public lamps, in addition to those mentioned in the fifth section of the ordinance for the construction and management of the Philadelphia Gas Works, passed March 21, 1835, shall be supplied with gas at one half the price paid by private consumers, the fixtures and meters therefor to be provided by the city. *Provided,* That the price paid for gas supplied to said lamps, shall not exceed the rate of one dollar and seventy-five cents for one thousand cubic feet; and that the said lamps shall be under the direction of the Committee on Police, or as may be hereafter provided by Councils.

SEC. 5. *And be it further ordained and enacted by the authority aforesaid,* That so much of the ordinance passed

the 21st day of March, 1835, for the construction and management of the Philadelphia Gas Works, as requires that all moneys arising from the manufacture and sale of gas shall be paid into the city treasury, is hereby repealed; and the receipt and payment of all moneys on account of said Gas Works shall hereafter be confided to the Trustees of said Works, and their authorized agents; and the city treasurer is hereby authorized to transfer to the said Trustees, all the books and papers in his custody relating to said Works. *Provided*, That the Select and Common Councils of Philadelphia, or either of them, shall be authorized, by any committee they may designate for that purpose, to examine all the books, accounts, and papers, relating to said Works, which may at any time be in possession of the said Trustees, or any of their officers or agents.

SEC. 6. *And be it further ordained and enacted by the authority aforesaid*, That the provisions of this ordinance shall be carried into effect on the stockholders of the Philadelphia Gas Works consenting thereto, which consent shall be certified in writing, under their hands, to the Select and Common Councils of Philadelphia, within thirty days from the first day of January, 1837; but nothing herein contained shall be construed to impair, or in any way to affect, the right of the Mayor, Aldermen, and Citizens of Philadelphia, to take possession of the said Works, agreeably to the provisions of the second section of the ordinance for the construction and management of the Philadelphia Gas Works, passed March 21st, 1835, converting the original stock of one hundred and twenty-five thousand dollars into a loan, according to the provisions of said second section, and assuming absolutely the payment of the loans authorized by this ordinance, and also the interest, if any, which may become payable thereon after such conversion and assumption. *Provided*, that if the said Mayor, Aldermen, and Citizens of Philadelphia shall so take possession of the said Works, before the first day of January, Anno Domini one thousand eight hundred and sixty-two, then the stocks composing the Sinking Fund, according to the second section of this ordinance, shall be sold; and the proceeds thereof, together with any moneys belonging thereto, shall be

distributed by the Trustees, as a dividend of profits to the stockholders.

Enacted into an ordinance at the City of Philadelphia, this 22d day of December, in the year of our Lord one thousand eight hundred and thirty-six.

AN ORDINANCE

REGULATING THE TRANSFERS OF STOCK IN THE PHILADELPHIA GAS WORKS.

Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled, That from and after the passage of this ordinance, all transfers of stock in the Philadelphia Gas Works shall be made before the Register appointed by the Trustees of said Works, any thing in any former ordinance to the contrary notwithstanding.

Enacted into an ordinance at the City of Philadelphia, this 31st day of January, in the year of our Lord one thousand eight hundred and thirty-seven.

AN ORDINANCE

FOR THE FURTHER EXTENSION OF THE PHILADELPHIA GAS WORKS.

SECTION 1. *Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled,* That for the purpose of enabling the Trustees of the Philadelphia Gas Works to extend the said works, especially by laying down a greater extent of pipes for the distribution of gas, the Mayor of the city is hereby authorized, on the requisition of the said Trustees, to borrow such sums of money as they may require, not exceeding two hundred thousand dollars in the whole, (in addition to the loan heretofore authorized,) for which certificates of one hundred dollars and upwards, but containing no fractional part of one hundred dollars, shall be issued to the lenders; which certificates shall be

transferable only at the office of the Philadelphia Gas Works. The said loans shall be redeemable on the first day of January, Anno Domini, one thousand eight hundred and sixty-three; and shall bear such rate of interest, not exceeding six per centum per annum, as may be fixed by the said Trustees, payable semi-annually, at the office of the Philadelphia Gas Works, on the first days of January and July ; provided that any premium received on said loans shall be paid to the city treasurer, and by him placed to the credit of the Sinking Fund of the city. The faith of the city, and the buildings, apparatus, pipes, and fixtures of the said Gas Works, shall be pledged for the punctual payment of the interest, from time to time, as the same may become due, and for the ultimate reimbursement of the principal of the said loan, when the same shall fall due ; and in order that provision may be made for the same, the Trustees are hereby authorized and required to set apart and reserve, out of the moneys received by them from the manufacture and sale of gas, the sum of eight per centum per annum, on the amount of the certificates issued by virtue of this ordinance, before any dividends of the profits of the said Works shall be declared and distributed among the stockholders; which said sum of eight per centum per annum, after deducting therefrom so much as may be necessary for the payment of interest on the loan, shall constitute a Sinking Fund; which said Sinking Fund, in the investment, management, appropriation, and duration thereof, shall be liable to all the provisions and restrictions contained in the second and third sections of an ordinance for the extension of the Philadelphia Gas Works, enacted on the 22d of December, 1836.

SEC. 2. *And be it further ordained and enacted by the authority aforesaid,* That four hundred public lamps, in addition to those heretofore provided for, shall be supplied with gas, on the terms, conditions, and stipulations contained in the fourth section of the said ordinance for the extension of the Philadelphia Gas Works.

SEC. 3. *And be it further ordained and enacted by the authority aforesaid,* That for the greater security of the premises into which gas has been or shall be introduced, it shall be lawful for the said Trustees to require that a suitable stop-

cock or other apparatus, shall be placed between the wall of the building and the gas meter ; and that the expense of the stop-cock or other apparatus, as well as of all services, pipes, and tubes beyond the length of sixteen feet, which may be required to supply any premises with gas, shall be reimbursed to the said Trustees, by the consumers of gas on the said premises.

SEC. 4. *And be it further ordained and enacted by the authority aforesaid,* That it shall be lawful for the said Trustees to provide, from time to time, such further and other rules and regulations under which the gas may be furnished to private consumers, as experience may suggest, and as the said Trustees may deem necessary or convenient in the use or consumption of gas.

SEC. 5. *And be it further ordained and enacted by the authority aforesaid,* That in order to enable the said Trustees to extend gas to Delaware Avenue, the wharves and other parts of the eastern front of the city, it shall be lawful for the said Trustees to erect and construct one or more station gasometers, to be located at such point or points, in the city of Philadelphia as they may deem expedient; which location shall first be approved by Councils.

SEC. 6. *And be it further ordained and enacted by the authority aforesaid,* That the provisions of this ordinance shall be carried into effect so soon as the holders of the stock of the said Gas Works shall, at a meeting to be called by the Trustees for that purpose, approve the same ; and provided also, that the holders of a majority of the stock of the said Gas Works shall, under their hands, certify to the Select and Common Councils their consent thereto; but nothing herein contained shall be construed to impair or in any way to affect the right of the Mayor, Aldermen, and Citizens of Philadelphia to take possession of the said Works, agreeably to the provisions of the second section of the ordinance for the construction and management of the Philadelphia Gas Works, passed March 21, 1835, converting the original stock of one hundred and twenty-five thousand dollars into a loan, according to the provisions of the said second section, and assuming absolutely the payment of the loans authorized by this ordinance, and by an

Ordinance for the Extension of the Philadelphia Gas Works, passed December 22, 1836 ; and also the interest, if any, which may become payable on said loans after such conversion and assumption; *Provided*, that if the said Mayor, Aldermen, and Citizens of Philadelphia shall so take possession of the said Works before the first day of January, Anno Domini one thousand eight hundred and sixty-three, then the stocks composing the Sinking Fund, according to the first section of this Ordinance, shall be sold ; and the proceeds thereof, together with any moneys belonging thereto, shall be distributed by the Trustees as a dividend of profit to the Stockholders.

SEC. 7. *And be it further ordained and enacted by the authority aforesaid*, That if the nett proceeds of the sales of Gas, shall in any one year enable the Trustees to declare a dividend of upwards of twelve per centum—one half of such excess beyond the said twelve per centum shall be applied and appropriated to the extension of the pipes and works for supplying the city with gas.

Passed February 8th, 1838.

A SUPPLEMENT

TO AN ORDINANCE ENTITLED “AN ORDINANCE FOR THE FURTHER EXTENSION OF THE PHILADELPHIA GAS WORKS, PASSED FEB. 8th, 1838.”

Be it ordained and enacted by the citizens of Philadelphia in Select and Common Councils assembled, That so much of the first section of an Ordinance to which this is a Supplement, as requires the Trustees of said Gas Works to pay over to the City Treasurer any premium that may be received on the loan authorized by said Ordinance, to be by him placed to the credit of the Sinking Fund of the city, be and the same is hereby repealed ; and that in lieu thereof, it shall be the duty of the said Trustees and they are hereby required to place the premium so received to the credit of the Sinking Fund pro-

vided for by said Ordinance, for the redemption of the debt created by reason of said loans.

Passed April 12th, 1838.

AN ORDINANCE

TO PROVIDE FOR LIGHTING FRANKLIN SQUARE AND THE
STREETS ADJACENT WITH GAS.

SECTION 1. *Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled,* That the Committee on Police be and they are hereby authorized, as soon as they may deem it expedient, to cause iron pipes, suitable for the conveyance of Gas, to be placed along such portions of the several streets bounding Franklin Square, as may be necessary to furnish with Gas the public lamps on those sides of the said streets next adjacent to the said Square, which lamps shall be lighted according to the provisions of an Ordinance entitled, "An Ordinance for the Construction and Management of the Philadelphia Gas Works," passed the 21st of March, 1835. *Provided*, that the size of said pipes shall not be more than three inches in diameter, and that the whole cost, including the laying of the same, shall not exceed Twelve Hundred Dollars, which sum is hereby appropriated to the Committee on Police, for that purpose.

SECTION 2. *And be it further ordained and enacted by the authority aforesaid,* That the Committee on Police, if they deem it expedient, may allow the use of said pipes to the Trustees of the Philadelphia Gas Works, for the purpose of accommodating private consumers, in which case the said Trustees shall refund and pay to the City the entire cost of that portion (not to be less than one-fourth of the whole,) so by them used.

SECTION 3. *And be it further ordained and enacted by the authority aforesaid,* That it shall be the duty of the Committee on Police, to cause Franklin Square to be lighted with

Gas, whenever the necessary pipes, lamps, and other fixtures shall be prepared for that purpose.

Passed May 11, 1837.

AN ORDINANCE

AUTHORIZING THE LIGHTING OF WASHINGTON SQUARE AND PARTS OF THE STREETS IMMEDIATELY ADJACENT THERETO WITH GAS.

Be it ordained and enacted by the Citizens of Philadelphia, in Select and Common Councils assembled, That the Committee on City Property be, and they are hereby authorized to cause Washington Square and the parts of streets immediately adjacent thereto, to be lighted with gas, under arrangement with the Trustees of the Philadelphia Gas Company, as to the extension of pipes to the several points necessary for those purposes.

Passed August 17th, 1837.

BY-LAWS
OF THE
BOARD OF TRUSTEES
OF THE
PHILADELPHIA GAS WORKS.

I. THE stated meetings of this Board shall be held on the first and third Friday evenings of each month. The hour of meeting shall be, in the months of November, December, January, and February, seven o'clock. P. M.; March, April, September, and October, half-past seven o'clock, P. M.; and May, June, July, and August, eight o'clock, P. M.

II. Special meetings shall be called by the President on the request in writing of three members, and also at such times as the President in his discretion may deem expedient. The object of the meeting shall be stated in the notice, and no other business shall be transacted at such meetings; unless it be specified that the meeting is called for the despatch of business generally.

III. Precisely at the appointed hour, the President shall take the chair, and call the members to order. In his absence, the members present shall appoint a chairman pro tem. If a quorum of members be not formed within half an hour after the time appointed for the meeting, the members present may adjourn to such time and place as the majority of them shall deem proper.

IV. The following order of business shall be observed at the stated meetings of the Board :

1. Roll call.
2. Reading the minutes of the preceding meeting.

3. Reading communications addressed to the Board.

4. Reports of standing committees.

5. Reports of special committees.

6. Deferred and unfinished business.

7. New business.

8. Reading and amending the rough minutes.

9. Adjournment.

V. All committees shall be appointed by the President, unless otherwise specially ordered.

VI. The yeas and nays upon any question shall be called and entered upon the minutes at the request of any member.

VII. All reports of committees shall be in writing ; and no report shall be received unless it be signed by a majority of the members of the committee ; provided that dissenting members shall have the right of presenting their views in writing, and provided also that the minutes of standing committees may be accepted as their reports.

VIII. All questions of order shall be decided by the President, and in case of an appeal from his decision, the Board shall decide the question by vote, without debate.

IX. The president shall vote on all questions ; but not debate thereon, without leave of the Board.

X. The Secretary shall, by messenger, summon the meetings of the Board, by written or printed notices, one day at least previous to the time of meeting.

He shall likewise, when requested to do so by the chairman of a committee, give a similar notice of the meetings of committees ; and if desired, attend at such meetings and act as secretary thereof.

He shall furnish the chairman of each committee with a notice of his appointment, a list of the members of the committee, a copy of the resolution under which they are appointed, and with such papers or documents as may be referred to them, or as the case may require.

XI. All contracts shall be made in writing, under the directions of the standing committees.

XII. In all cases not provided for by the by-laws, the Board shall be governed by the rules of the Select Council.

XIII. No new by-law shall be adopted, and no alteration shall at any time be made in the existing by-laws, unless the same shall have been submitted at one stated meeting, and approved of by a majority of the members present at the next subsequent stated meeting. But a by-law may be suspended at any meeting, with the consent of at least two-thirds of the members present.

XIV. All resolutions offered by any member of the Board shall be in writing, and when members speak on any question before the Board, they shall rise and address the chair.

June 1, 1838.

FORM OF THE CERTIFICATE

GIVEN IN COMPLIANCE WITH A RESOLUTION, ADOPTED
BY THE MUTUAL AND OTHER INSURANCE COMPANIES,
IN RELATION TO INSURANCE ON BUILDINGS INTO WHICH
THE GAS IS INTRODUCED.

“*Resolved*, That in every instance where buildings are insured by this Company, where Gas is, or may be used, that a Stopcock shall be placed between the wall of the building and the Gas meter, and as near the wall as the circumstances of the case will admit. And upon evidence being produced to the Treasurer, that the Gas has been introduced under the direction of the Trustees of the Gas Works, and in conformity with these provisions, he is hereby authorized to endorse upon the Policies, permission to use it without prejudice to the insurance, and without any additional premium being charged.”

I certify that the above is a true copy of a resolution, passed at a meeting of the Managers of the “Mutual Assurance Company for insuring houses from loss by fire,” held on the 9th March, 1836.

LAWRENCE LEWIS, Secretary.

I certify that has complied with the foregoing regulation adopted by Insurance Companies, in relation to the introduction of Gas in premises

----- *Inspector.*

Gas Works, Philadelphia,

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Resolved, That in case of any change in the
 terms of the contract, the same shall be
 subject to the approval of the Board of Directors,
 and no change shall be made without their
 consent. And upon evidence being
 produced to the Treasurer, that the same has been
 made in accordance with the terms of the contract,
 and is in conformity with the provisions of the
 charter, the same shall be paid without any
 further action in the premises, and without any
 additional payment being charged.

I hereby certify that the above is a true copy of a resolution passed
 at a meeting of the Board of Directors of the National Assurance Com-
 pany, for the purpose of amending the charter, held on the 21st
 March, 1904.
 J. A. WILSON, Secretary.

I hereby certify that the above is a true copy of a resolution passed
 at a meeting of the Board of Directors of the National Assurance Com-
 pany, for the purpose of amending the charter, held on the 21st
 March, 1904.
 J. A. WILSON, Secretary.

APPENDIX.

REPORT OMITTED, AND WHICH SHOULD HAVE BEEN INTRODUCED AT PAGE 115.

REPORT

OF THE

COMMITTEE ON FINANCE.

FEBRUARY 8, 1838.

To the Select and Common Councils :

The Committee of Finance, who were instructed by a resolution, passed on the 1st inst., to inquire into the expediency of redeeming the stock of the Philadelphia Gas Works, by the issue of six per cent. stock, agreeably to the provisions of the Ordinance passed March 21st, 1835, entitled an Ordinance for the construction and management of the Philadelphia Gas Works, respectfully

REPORT :

That having had the subject under consideration, they are of opinion, that the measure proposed would be one neither advantageous to the city, nor just to the stockholders of the Gas Works.

The establishment of the manufacture of Gas in this city was a new and doubtful experiment. The Councils of 1835, after maturely considering the subject and consulting public opinion, (as they were bound to do in a matter of so much importance,) declined constructing the Works on account of the city; but entrusted the undertaking to a body of stockholders willing to venture their funds in this untried scheme.

Scarcely two years have elapsed since the Works were so far completed, as to admit of commencing the manufacture. The experiment is still in its infancy; and all the prudential considerations which influenced Councils in 1835, still exist to almost an equal extent, to recommend an adherence to the policy then adopted.

The Works are still in an incipient state, and although the results have heretofore been favourable, yet they are far from conclusive as to the entire ultimate success of the undertaking. It is still a subject of doubt how long the apparatus and fixtures now put up, will last. The short experience already obtained proves conclusively, that great and extensive repairs will soon be required at the Works. The last report of the Trustees shows that already the iron roof of the retort house requires renewal, and that the first gasometer constructed will also require such extensive repairs as almost to amount to an entire reconstruction. It is, as yet, impossible to determine how soon other parts of the establishment may also require to be renewed.

The retorts (made of cast iron,) are found to undergo rapid destruction, and to occasion considerable expense in keeping them in order. Whether the pipes themselves, which are distributed through the city, will be found durable, is still a subject of doubt. Exposed to the action of gas, of moisture, and of atmospheric influence, they may require frequent repairs at the joints to preserve them air-tight. While, therefore, the Committee will not question that the manufacture is established on a safe and durable foundation, they are not prepared to say that it will always prove as profitable as it may at present appear to be; a large sum must yet be expended in order to extend the distribution of Gas.

The report of the Trustees, presented a short time since, shows that a capital, almost equal to that embarked in it, must be invested before all the Gas which the present Works are capable of making, can be distributed. How much more will ultimately be required to extend its benefits to every point in the city, cannot at this time be accurately ascertained; but it is apparent, that if undertaken by Councils, the expense would tend largely to swell the city debt, the amount of which is al-

ready so great. In the hands of the Corporation, applications would, undoubtedly, be constantly pressed upon Councils to extend the pipes to many parts of the city where private consumption would be insufficient to defray the cost; and the Works would thus become a burthen instead of a relief to the city finances; and the numberless applications for extensions would, if granted, increase our taxes, and if refused, excite feelings of jealousy and dissatisfaction, which would materially affect the interest and welfare as well of the works as of the city.

We find from the report of the Trustees, that the Gas pipes are already laid upon a length of upwards of thirteen miles. They extend from the Works, on the Schuylkill, to Delaware Second street; and along the latter from one extremity of the city to the other: from Vine to South street.

The Trustees have laid the pipes without being influenced by any local or sectional interests, but with the sole view to accommodate the demand, wherever it was most urgent. They have lighted indiscriminately, the wide streets and narrow alleys within the range of the pipes, and wherever desired by the Committee on City Police they have at once lighted public lamps at half price in all such streets and alleys. Admitting that the Gas lamps cost as much as the common City lamps, how much more light do they not give for the same money, and how much brighter are they not than even the argand lamp, though the annual cost of the latter is more than twice as great as that of the former!

In order to appreciate the bonus now paid to the city by the stockholders of the Gas Works, it should be borne in mind that they have erected at their own expense, three hundred *public* lamps at a cost of upwards of \$5,550, and that by lighting the public lamps at *half price*, the contribution to the public, paid by the Works, amounted for the

Quarter ending March 1st, 1837, to	\$591 13
“ June “	537 58
“ Sept. “	504 33
“ Dec. “	907 81
Making an aggregate in the year 1837, of	\$2,540 85

And it should be observed that during the first quarter, only one hundred and fifty public lamps were lighted with gas, while there are now upwards of three hundred; and that the Gas Works have already contracted to supply the city with an additional three hundred at the same price; if the Ordinance reported by this Committee on the 1st inst., should pass Councils, the number will then be extended to one thousand; upon each of which, the public now receives as a bonus, a deduction on the charge of Gas, amounting to about *twelve dollars* per annum; making the total bonus which will then be paid by the Works, equal to *twelve thousand dollars per annum*.

In the opinion of this Committee, it is more to the interest of the city to continue to derive this benefit from the Works (and even to extend it by granting additional privileges to the present Company,) than by exercising their right of redemption to jeopard the success of the whole enterprise.

The Committee think they will be borne out by public opinion, in stating that the management of the Works has been so far highly judicious; and that the Trustees, standing as a disinterested, impartial and independent body between the city and the stockholders, have administered their trust with fidelity to both, and in a manner to give no just cause for complaint in any quarter. It will, therefore, be wise to let well enough alone, and to be satisfied with the good we enjoy without hazarding doubtful experiments not called for or desired by the public. If satisfied with their present Works, the Trustees had manifested any unwillingness to extend the distribution to parts of the city which are not now benefited by it, a case might then have arisen requiring the exercise on the part of Councils, of their reserved rights; but while we see both the Trustees and stockholders uniting in expending every cent at their disposal in the extension of the Works, and evincing by their recent application to Councils, a desire to diffuse the benefit of gas lights to every point in the city, it would seem unwise to hesitate in giving them the means of accomplishing this object. It appears from the application lately made, that the Trustees propose to carry their largest main along the western front of the city, from the Works to Spruce

street ; and through the southern section, from Ashton street to the Delaware, by a twelve inch main in Spruce street ; also, to run mains in Chesnut, Walnut, and Arch streets, west of Delaware Ninth street, and to construct such gasometers on the eastern front, as will admit of lighting Delaware Avenue and the Wharves, from Vine to Cedar street. Besides which system of main pipes, they ask to be permitted to extend lateral branches in every direction to the amount of forty thousand dollars.

The Committee deem it unnecessary to comment upon this enlightened and liberal policy, as their observations would be anticipated by all those who have attentively perused the late report of the Trustees ; which exhibits, at the same view, the energetic measures already completed, and the liberal and expanded projects of future expenditures in contemplation.

There is, however, another view of the subject which the Committee deem it their duty to present. The report shows that the stockholders have not yet received even the ordinary legal interest of six per cent. on the capital invested by them. Including even the third dividend just declared, it will be found that they have received but fourteen per cent. in two years and a half, taking the average date of the payments of the instalments. Whatever may be the strict rights of the city, common justice would seem to require that those who were enterprising and bold pioneers in a doubtful scheme of great public utility, and who cheerfully staked their whole capital upon the success of the project, should not be cut off at once from the chance of remuneration, when the experiment appears likely to prove successful ; especially when no cause of complaint exists as to the skill, liberality and ability with which the Works are and have been conducted.

The Committee will enlarge no further upon this point, but merely add, that from the above considerations as well as from others unnecessary to dwell upon, they report that it is in their opinion, inexpedient at this time to redeem the stock of the Gas Works, and they earnestly recommend to Councils the passage of the Ordinance for the further extension of the Philadelphia Gas Works, submitted on the 1st inst. They beg leave, in conclusion, to submit the annexed resolution :

Resolved, That the Committee be discharged from the further consideration of the subject.

A. FERGUSON,
LAWRENCE LEWIS,
JAMES CRISSY,
HENRY J. WILLIAMS,
J. ROWLAND,
J. L. FENIMORE.

Committee on Finance.

Reports of the trustees of the Philadelphia Gas Works to the select and
common councils of the City of Philadelphia

Philadelphia 1838

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